



# **INCONTROL for z/OS**

## **9.0.00**

### **Administrator Guide**



**July 2015**



## Contacting BMC Software

You can access the BMC Software website at <http://www.bmc.com>. From this website, you can obtain information about the company, its products, corporate offices, special events, and career opportunities.

### United States and Canada

<b>Address</b>	<b>BMC SOFTWARE INC</b>	<b>Telephone</b>	<b>▪ 713 918 8800</b>	<b>Fax</b>	<b>713 918 8000</b>
	<b>2101 CITYWEST BLVD</b>		<b>▪ 800 841 2031</b>		
	<b>HOUSTON TX</b>				
	<b>77042-2827</b>				
	<b>USA</b>				

### Outside United States and Canada

<b>Telephone</b>	<b>(01) 713 918 8800</b>	<b>Fax</b>	<b>(01) 713 918 8000</b>
------------------	--------------------------	------------	--------------------------

© Copyright 1999-2015 BMC Software, Inc.

BMC, BMC Software, and the BMC Software logo are the exclusive properties of BMC Software, Inc., are registered with the U.S. Patent and Trademark Office, and may be registered or pending registration in other countries. All other BMC trademarks, service marks, and logos may be registered or pending registration in the U.S. or in other countries. All other trademarks or registered trademarks are the property of their respective owners. IT Infrastructure Library® is a registered trademark of the Office of Government Commerce and is used here by BMC Software, Inc., under license from and with the permission of OGC.

ITIL® is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office, and is used here by BMC Software, Inc., under license from and with the permission of OGC.

IBM® Tivoli® Business Service Manager, IBM Tivoli Workload Scheduler, IBM Cognos, IBM InfoSphere DataStage, IBM iSeries, IBM Websphere, and AIX® are the trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both.

UNIX® is the registered trademark of The Open Group in the US and other countries.

Linux is the registered trademark of Linus Torvalds.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

SAP® R/2 and SAP R/3, SAP Business Objects, and SAP NetWeaver are trademarks or registered trademarks of SAP AG in Germany and in several other countries.

BMC Software considers information included in this documentation to be proprietary and confidential. Your use of this information is subject to the terms and conditions of the applicable End User License Agreement for the product and the proprietary and restricted rights notices included in this documentation.

## Restricted rights legend

U.S. Government Restricted Rights to Computer Software. UNPUBLISHED -- RIGHTS RESERVED UNDER THE COPYRIGHT LAWS OF THE UNITED STATES. Use, duplication, or disclosure of any data and computer software by the U.S. Government is subject to restrictions, as applicable, set forth in FAR Section 52.227-14, DFARS 252.227-7013, DFARS 252.227-7014, DFARS 252.227-7015, and DFARS 252.227-7025, as amended from time to time. Contractor/Manufacturer is BMC SOFTWARE INC, 2101 CITYWEST BLVD, HOUSTON TX 77042-2827, USA. Any contract notices should be sent to this address.

## Customer support

You can obtain technical support by using the BMC Software Customer Support website or by contacting Customer Support by telephone or e-mail. To expedite your inquiry, see "Before contacting BMC."

## Support website

You can obtain technical support from BMC 24 hours a day, 7 days a week at <http://www.bmc.com/support>. From this website, you can:

- Read overviews about support services and programs that BMC offers
- Find the most current information about BMC products
- Search a database for issues similar to yours and possible solutions
- Order or download product documentation
- Download products and maintenance
- Report an issue or ask a question
- Subscribe to receive proactive e-mail alerts when new product notices are released
- Find worldwide BMC support center locations and contact information, including e-mail addresses, fax numbers, and telephone numbers

## Support by telephone or e-mail

In the United States and Canada, if you need technical support and do not have access to the web, call 800 537 1813 or send an e-mail message to [customer\\_support@bmc.com](mailto:customer_support@bmc.com). (In the subject line, enter **SupID:<yourSupportContractID>**, such as SupID:12345). Outside the United States and Canada, contact your local support center for assistance.

## Before contacting BMC

Have the following information available so that Customer Support can begin working on your issue immediately:

- Product information
  - Product name
  - Product version (release number)
  - License number and password (trial or permanent)
- Operating system and environment information
  - Machine type
  - Operating system type, version, and service pack or other maintenance level such as PUT or PTF

- System hardware configuration
- Serial numbers
- Related software (database, application, and communication) including type, version, and service pack or maintenance level
- Sequence of events leading to the issue
- Commands and options that you used
- Messages received (and the time and date that you received them)
  - Product error messages
  - Messages from the operating system, such as `file system full`
  - Messages from related software

### **License key and password information**

If you have questions about your license key or password, contact BMC as follows:

- (USA or Canada) Contact the Order Services Password Team at 800 841 2031, or send an e-mail message to [ContractsPasswordAdministration@bmc.com](mailto:ContractsPasswordAdministration@bmc.com).
- (Europe, the Middle East, and Africa) Fax your questions to EMEA Contracts Administration at +31 20 354 8702, or send an e-mail message to [password@bmc.com](mailto:password@bmc.com).
- (Asia-Pacific) Contact your BMC sales representative or your local BMC office.

### **Third party Software**

For the provisions described in the BMC License Agreement and Order related to third party products or technologies included in the BMC Product, see

<https://docs.bmc.com/docs/display/workloadautomation/Control-M+Workload+Automation+Documentation> and click **Third-party software (TPS)**.

# Contents

About this Guide .....	10
Overview of Contents .....	10
Conventions Used in this Guide .....	12
Information New to this Version .....	14
Related Publications .....	14
 IOA Concepts and Components .....	 17
Overview .....	17
INCONTROL Products and IOA .....	17
Installation and Maintenance .....	19
Online Facility .....	20
Logic .....	21
 IOA Administration .....	 35
Overview .....	35
IOA Online Environment .....	35
Customizing the IOA Online Environment .....	43
IOA Access Method .....	71
IOA Profiles .....	78
Modifying INCONTROL Product Defaults .....	101
Modifying IOA Messages .....	102
Message Destination Tables .....	105
General IP parameters .....	119
IOAMAIL .....	120
IOA support for DO REMEDY .....	121
IOAAPI .....	129
IOA Variable Database Facility .....	141
Expanding Various IOA Files .....	175
CMEM-related maintenance .....	178
Problem determination .....	178
 Control-M .....	 193
Overview .....	193
Basic Operations .....	193
Basic Administrative Functions .....	213

Ordering and Submitting Jobs and Started Tasks.....	237
Managing the Control-M Application Server (CTMAS) .....	262
Managing the CMEM Facility.....	264
Supporting Interfaces .....	285
Tuning Recommendations.....	312
Single and Multiple CPU Configuration and Support .....	323
CTMPLEX: Control-M for the Sysplex.....	338
Troubleshooting and Disaster Recovery Planning.....	345
Planning and Creating a Disaster Recovery Plan .....	357
 Control-D and Control-V.....	 366
Initialization, Customization, and Administration Features .....	366
New Day Processing .....	375
Mission Scheduling .....	385
Decollation Mission Management.....	392
Printing Mission Management.....	405
Advanced ACIF Interface Facility .....	429
Collecting resources for transformation.....	436
Transforming Reports To PDF Format.....	440
Approving reports.....	444
Control-D/Page On Demand.....	446
Control-D File Transfer Option.....	458
Mainframe – PC File Transfer .....	467
Control-D/Image .....	480
Backup Mission Management .....	484
Restore Mission Management.....	491
Migration Mission Management (Control-V Only) .....	496
Global Index Facility (Control-V Only) .....	514
Job Archiving .....	522
IOA Archive Server .....	525
User Report List File Management .....	534
Repository Maintenance.....	546
SMF Accounting .....	549
 Control-O.....	 551
Overview .....	551
Control-O Rules.....	555
Private REGION Requirements of the Control-O Monitor .....	564
Control-O Usage of the Common Service Area (CSA and ECSA) .....	566

Control-O Usage of the Extended Link Pack Area .....	568
Recommended Organization Method .....	568
Management of Control-O Facilities .....	573
Reacting to Events in a Sysplex Environment .....	591
Customization of Automation Options .....	592
Control-O and Control-M in the Same INCONTROL Environment.....	602
Control-O/CICS Interface .....	603
Control-O/IMS Interface .....	605
Control-O MAINVIEW Alarm Interface.....	606
Control-O MAINVIEW AutoOPERATOR interface .....	607
Control-O SMS Interface .....	609
Starting Control-O Communication Support (IOAGATE) .....	611
 Control-M/Analyzer .....	 614
Overview .....	614
Control-M/Analyzer New Day Procedure.....	614
Invoking Control-M/Analyzer (Runtime Environment) .....	617
Control-M/Restart Support for the Control-M/Analyzer Rollback Facility.....	624
 Control-M/Tape.....	 626
Overview .....	626
Control-M/Tape Real-Time Environment.....	626
New Day Procedure .....	633
Repository Structure .....	636
Repository Maintenance.....	647
Repository Backup and Recovery.....	652
Displaying Media Database Information on an OS/390 or z/OS Console .....	655
Control-M/Restart Support for Control-M/Tape .....	657
Control-M/Tape Application Programming Interface.....	658
 IOAGATE .....	 711
Overview .....	711
IOAGATE EXEC Parameters.....	711
IOAGATE Modify Commands .....	714
Diagnostic SNAP Modify Commands.....	742
 Exits.....	 745
Overview .....	745
IOA Exits .....	750

Control-M Exits .....	754
Control-M/Restart Exits .....	758
Control-D and Control-V Exits .....	760
Control-M/Analyzer Exits .....	778
Control-M/Tape Exits .....	779
Control-O Exits .....	781
 A INCONTROL Application Program Names .....	 782
 B Dataset Formatting Jobs for INCONTROL Products .....	 784
 C Modifying IOA Online Facility Commands .....	 787
Modifying IOA Online Facility PFKey Definitions .....	788
 D Logical Field Names for the Control-M/Tape Repository .....	 789
Dataset record table .....	791
Volume record table .....	796
Stacking record tables .....	802
Trace record tables .....	804
SMF record table .....	806
 E IOA Online Options Cross-reference .....	 807
Options in the IOA PANEL Library .....	822
 F General Use Assembler Macros and Modules .....	 825
CTMCOD Assembler Macro .....	825
IOAENV Assembler Macro .....	829
IOAMEM Assembler Macro .....	830
 G Customizing the Control-M Active Environment Screen .....	 839
Modifying the \$\$ACT Member .....	839
Modifying Definitions in Members Containing Assembler Macro Instructions .....	840



H Control-O Monitor and CMEM Modify Commands .....	848
I Control-D/V diagnostic trace levels .....	854
J Control-M diagnostic trace levels .....	860
K Control-D audit service .....	867
Overview .....	867
Running the auditing service .....	868
Event record structure .....	872
Audit Examples .....	876

## About this Guide

This guide contains the information necessary for INCONTROL™ administrators who are responsible for customizing and maintaining the INCONTROL family of products.

Basic information about how INCONTROL products operate is provided in user guides for each product.

Most administration information for each product is found in the chapter devoted to that product.

However, it is recommended that all INCONTROL administrators read [IOA Concepts and Components](#) (on page 17) and [IOA Administration](#) (on page 35) before continuing with the remainder of this guide.

## Overview of Contents

The guide is divided into the following chapters and appendices:

### Chapter 1 – IOA Concepts and Components

Overview of the IOA environment and a description of key IOA concepts and components.

### Chapter 2 – Customizing and Administering IOA

How to customize and maintain the IOA environment.

### Chapters 3 through 8 – Customizing and Administering each of the INCONTROL Products

Information about administrative tasks for each INCONTROL product. Each chapter includes information on the product's New Day processing and workflow, as well as information about how the relevant product can be used to perform specific tasks. These chapters also include information about the structure of relevant files, operator commands, and so on.

Control-M/Restart is described together with Control-M in Chapter 3, "Control-M". Control-V is described together with Control-D in Chapter 4, "Control-D and Control-V."

### Chapter 9 – Exits

Information on exits available with each INCONTROL product that can be used to modify operations.

### Appendix A – INCONTROL Application Program Names

Describes the application program names that are contained in INCONTROL product tapes.

## Appendix B – Dataset Formatting Jobs for INCONTROL Products

Describes members that are ISPF skeletons, which can be used to create, allocate, and/or format INCONTROL product datasets.

## Appendix C – Modifying IOA Online Facility Commands

Describes how to change the names of the IOA Online facility commands.

## Appendix D – Logical Field Names for the Control-M/Tape Repository

The tables in this section list fields that can be

- specified in utility INCLUDE/EXCLUDE statements to determine which records are processed when the utility runs
- manually updated in the Media Database with the CTTMUP utility
- included in utility-generated reports

## Appendix E – IOA Online Options Cross-Reference

Cross-reference between IOA Online Options and screen titles, modules, CSETs, and format, PFKey, command, and help members.

## Appendix F – General Assembler Macros (Modules)

Describes the assembler macros and modules provided with INCONTROL products.

## Appendix G – Customizing the Control-M Active Environment Screen

Describes methods for customizing Control-M Active Environment screens for local language, local site terminology, and ease of use.

## Appendix H – Control-O Monitor and CMEM Modify Commands

Contains a table of descriptions and parameters for the Control-O Monitor and CMEM Modify commands.

## Appendix I – Control-D/V diagnostic trace levels

Contains a partial listing of diagnostic trace levels available for Control-D and Control-V components.

## Appendix J – Control-M diagnostic trace levels

Contains a partial listing of diagnostic trace levels available for Control-M.

## Appendix K – Control-D audit service

Describes how to prepare and run Control-D audit services for tracking IT processes and their related business information. This auditing option enables tracking user actions and changes to reports, providing the audit information to designated users for analysis.

## Conventions Used in this Guide

Notational conventions that may be used in this guide are explained below.

### Standard Keyboard Keys

Keys that appear on the standard keyboard are identified in boldface, for example, **Enter**, **Shift**, **Ctrl+S** (a key combination), or **Ctrl S** (a key sequence).

The commands, instructions, procedures, and syntax illustrated in this guide presume that the keyboards at your site are mapped in accordance with the EBCDIC character set. Certain special characters are referred to in this documentation, and you must ensure that your keyboard enables you to generate accurate EBCDIC hex codes. This is particularly true on keyboards that have been adapted to show local or national symbols. You should verify that

\$ is mapped to x'5B'

# is mapped to x'7B'

@ is mapped to x'7C'

If you have any questions about whether your keyboard is properly mapped, contact your system administrator.

### Preconfigured PFKeys

Many commands are preconfigured to specific keys or key combinations. This is particularly true with regard to numbered PF keys, or pairs of numbered PF Keys. For example, the END command is preconfigured to, and indicated as, PF03/PF15. To execute the END command, press either the PF03 key or the PF15 key.

Instructions to enter commands may include

- only the name of the command, such as, enter the END command
- only the PF keys, such as, press **PF03/PF15**
- or both, such as, press **PF03/PF15**, or enter the END command

## Command Lines and Option Fields

Most screens contain a command line, which is primarily used to identify a single field where commands, or options, or both, are to be entered. These fields are usually designated **COMMAND**, but they are occasionally identified as **COMMAND/OPT** or **COMMAND/OPTION**.

Option field headings appear in many screens. These headings sometimes appear in the screen examples as **OPTION**, or **OPT**, or **O**.

## Names of Commands, Fields, Files, Functions, Jobs, Libraries, Members, Missions, Options, Parameters, Reports, Subparameters, and Users

The names of commands, fields, functions, jobs, libraries, members, missions, options, parameters, reports, subparameters, users, and most files, are shown in standard **UPPERCASE** font.

### User Entries

In situations where you are instructed to enter characters using the keyboard, the specific characters to be entered are shown in this **UPPERCASE BOLD** text, for example, type **EXITNAME**.

## Syntax statements

In syntax, the following additional conventions apply:

- A vertical bar ( **|** ) separating items indicates that you must choose one item. In the following example, you would choose *a*, *b*, or *c*:  
  
a | b | c
- An ellipsis ( **...** ) indicates that you can repeat the preceding item or items as many times as necessary.
- Square brackets ( **[ ]** ) around an item indicate that the item is optional. If square brackets ( **[ ]** ) are around a group of items, this indicates that the item is optional, and you may choose to implement any single item in the group. Square brackets can open ( **[** ) and close ( **]** ) on the same line of text, or may begin on one line of text and end, with the choices being stacked, one or more lines later.
- Braces ( **{ }** ) around a group of items indicates that the item is mandatory, and you must choose to implement a single item in the group. Braces can open ( **{** ) and close ( **}** ) on the same line of text, or may begin on one line of text and end, with the choices being stacked, one or more lines later.

## Screen Characters

All syntax, operating system terms, and literal examples are presented in this typeface. This includes JCL calls, code examples, control statements, and system messages. Examples of this are:

- calls, such as

```
CALL 'CBLTDLI'
```

- code examples, such as

```
FOR TABLE owner.name USE option, . . . ;
```

- control statements, such as

```
//PRDSYSIN DD * USERLOAD PRD(2) PRINT
```

- system messages, both stand-alone, such as You are not logged on to database database\_name, and those embedded in text, such as the message You are not logged on to database database\_name, are displayed on the screen.

## Variables

Variables are identified with *italic* text. Examples of this are:

- In syntax or message text, such as  
Specify database *database\_name*
- In regular text, such as  
replace database *database\_name1* with database *database\_name2* for the current session
- In a version number, such as  
EXTENDED BUFFER MANAGER for IMS 4.1.*xx*

## Special elements

This guide includes special elements called *notes* and *warnings*:

Notes provide additional information about the current subject.

Warnings alert you to situations that can cause problems, such as loss of data, if you do not follow instructions carefully.

## Information New to this Version

Additional information that is new to this version is described in the *INCONTROL for z/OS Installation Guide: Upgrading* and the What's New section of the *INCONTROL for z/OS Release Notes*.

## Related Publications

### INCONTROL for z/OS Installation Guide

A step-by-step guide to installing, customizing, maintaining, and upgrading INCONTROL products using the INCONTROL Customization and Installation Engine (ICE) application.

The guide is divided into the following volumes:

- *INCONTROL for z/OS Installation Guide: Installing*

This guide describes the procedures and steps required for installing INCONTROL products.

The following installation tracks are available:

- express installation
- customized installation
- cloning

- *INCONTROL for z/OS Installation Guide: Customizing*

This guide describes the procedures and steps required for customizing INCONTROL products.

- *INCONTROL for z/OS Installation Guide: Maintaining*

This guide describes the procedures and steps required for maintaining INCONTROL products.

The following maintenance procedures are described:

- periodic maintenance
- ad hoc maintenance
- change deployment

- *INCONTROL for z/OS Installation Guide: Upgrading*

This guide contains instructions for upgrading to the current release from previous INCONTROL versions.

The Express Upgrade is the recommended approach for upgrading INCONTROL products to the most recent major version.

## INCONTROL for z/OS Messages Manual

A comprehensive listing and explanation of all IOA and INCONTROL messages.

## INCONTROL for z/OS Security Guide

Step-by-step guide to implementing security in INCONTROL products using the ICE application. Security guides are currently available for IOA interaction with RACF, CA-TOP SECRET and CA-ACF2.

## INCONTROL for z/OS Utilities Guide

A detailed description of the utilities designed to perform specific administrative tasks that are available to INCONTROL products. The guide contains an alphabetized reference of all utilities for each INCONTROL product.

## User Guides

Product-specific guides containing comprehensive information about the operation and implementation of each INCONTROL product.



# IOA Concepts and Components

## Overview

Integrated Operations Architecture (IOA) is the keystone of a fully integrated family of products (INCONTROL products) designed to help you streamline and automate your mainframe operations.

IOA provides you with the capability of implementing unattended, "lights out" operations.

## INCONTROL Products and IOA

The INCONTROL family of products shares a set of common components and concepts. This chapter contains an introduction to the INCONTROL products and the basic concepts and components used in IOA processing.

## IOA

IOA is at the heart of the INCONTROL family of products. IOA has a common core of shared code as the foundation of its architecture design. INCONTROL's IOA environment has several inherent design advantages, including a common user interface and a shared data repository. A key feature of the IOA environment is its integrated application design, which includes

- integrated user notification
- management by exception
- integrated scheduling
- interdependency and interrelationship handling
- common help facility
- integrated management reporting
- common method for sharing information
- unified installation and maintenance
- unified security implementation
- open interface design

## INCONTROL

The INCONTROL family of products includes:

**Table 1 List of INCONTROL Products**

Product	Description
<b>Control-M</b>	<b>Automated Production Control and Scheduling System</b> Manages and automates the setup, scheduling and execution of jobs in the data center.
<b>Control-M/JCL Verify</b>	<b>Site Standards Enforcement and JCL Validation System</b> Validates JCL jobs, ensures site standards, and issues validation reports. While Control-M/JCL Verify is closely integrated with Control-M for z/OS, it can be installed as a standalone product on sites that are not using Control-M.
<b>Control-M/Restart</b>	<b>Restart Management System</b> Automates the activities that must be performed when restarting failed jobs, including the scratching and uncataloging of datasets created by failed jobs.
<b>Control-M/Tape</b>	<b>Removable Media Management System</b> Increases utilization of removable media and controls retention periods. Prevents misuse of media, and provides tape library and vault control.
<b>Control-M/Analyzer</b>	<b>Automated Information Integrity System</b> Performs in-stream validation, accuracy, and reasonability checks on information used by data center production tasks (for example, reports, databases).
<b>Control-D</b>	<b>Output Management System</b> Automatically schedules and controls every aspect of report processing and distribution, including report decollating, bundling, printing, online viewing, and archiving.
<b>Control-V</b>	<b>Quick Access Archive Viewing System</b> Provides online access to archived reports and documents by indexed data retrieval.
<b>Control-D/ Page On Demand</b>	<b>Report Retrieval and Display System</b> Enables end users to retrieve and view pages of reports that reside on mainframe storage in real time. Indexed reports can be retrieved by index name and value. AFP and XEROX reports can also be retrieved and displayed using Control-D/WebAccess Server or Control-D/Page On Demand API.

Product	Description
Control-D/Image	<b>Image Output Management System</b> Enables output from commercial imaging equipment to be imported into either Control-D or Control-V for decollation, distribution and viewing, and into Control-V for archiving and indexed retrieval.
Control-O	<b>Console Automation System and Desired State Monitoring System</b> Monitors and automatically responds to messages, commands, and dataset events, as well as various other system events.  The Control-O/COSMOS feature allows for status monitoring while maintaining all critical system objects in a desired and ideal status.

A number of common components are shared by INCONTROL products. Furthermore, various INCONTROL products use similar operating procedures. The remainder of this chapter contains a brief description of components and features common to INCONTROL products, followed by references indicating where more detailed information can be found.

## Installation and Maintenance

Installation of INCONTROL products is performed using an ISPF menu-driven interface, the INCONTROL Installation and Customization Engine (ICE).

Maintenance is performed using SMP/E.

## Installation and Customization Engine

ICE is an ISPF application used to install and customize INCONTROL products. It consists of a series of dialog screens that provide a simple method to enter data and to create and submit installation jobs.

Tasks in ICE are organized in a hierarchical manner.

ICE displays the IOA installation online activities in the INCONTROL Installation Options screen. Each menu option represents a key activity related to installing and maintaining IOA.

Each activity is organized as a list of major steps. Each major step consists of one or more minor steps.

Each minor step allows the user to specify parameters, submit jobs, or perform other tasks related to the installation process.

For a detailed description of the ICE application, see the *INCONTROL for z/OS Installation Guide: Installing*.

## Product Maintenance

Product maintenance is the process by which updates are implemented between versions. These updates may consist of improvements to the software or resolutions to problems that were discovered during day-to-day product use. These updates are implemented using SMP/E only.

Product maintenance falls into two categories:

- Periodic maintenance, sometimes called preventative maintenance, consists of software updates (PTFs) that are collected, tested and distributed as a package on a periodic basis. The maintenance level of an installation is defined by the highest level of periodic maintenance applied.
- Ad hoc maintenance, sometimes called corrective maintenance, consists of one or more PTFs that are applied as necessary, according to specific customer needs.

For a detailed description of maintenance implementation, see the *INCONTROL for z/OS Installation Guide: Maintaining*.

## Online Facility

The IOA Online facility (IOAOMON) is a set of interactive applications that facilitate communication with IOA. The IOA Online facility generates all IOA screens and handles all IOA online functions.

The IOA Online facility can be accessed directly under TSO, ISPF, TSO/ISPF and ROSCOE. In addition, the IOA Online facility can be accessed using CICS, IMS, IDMS, VTAM, ROSCOE, TSO or COM-LETE under the IOA Online monitor.

When a user enters the IOA Online environment using a communication monitor or TSO/ISPF, the IOA Primary Option menu is displayed. This menu lists the options available to the user.

For a description of the IOA Online facility, see [IOA Administration](#) (on page 35).

## IOA Primary Option Menu

The IOA Primary Option menu displays INCONTROL product options and facilities available to the user.

The IOA Primary Option menu is dynamically generated according to the products and options available to the user. The INCONTROL administrator can optionally customize the environment so that specific products and options are available only to certain users or user groups.

The IOA Primary Option menu is displayed in one of two formats, depending on the number of options available to the user.

**Table 2      Formats for the IOA Primary Option Menu**

Format	Description
Line Format	Options are listed one per line with a description of each option.
Box Format	Options are grouped according to product. Descriptions are not displayed.

Reducing or increasing the number of available options may change the format in which the IOA Primary Option menu is displayed.

For a description of menu format and customization, see [IOA Administration](#) (on page 35).

## Logic

This section discusses various components of INCONTROL products.

### Automated Processing Definitions

Automated processing definitions enable the user to define the tasks to perform and when to perform them. Automated processing definitions contain statements that describe actions to be performed and criteria that define when, and under what conditions, the actions are performed. Each INCONTROL product contains a definition facility by which automated processing is defined.

Automated processing definitions are referred to as jobs, rules, or missions – depending on the INCONTROL product and type of definition.

Online methods for creating automated processing definitions are described in the online facilities chapter of the user guide for each INCONTROL product.

Job and rule and mission definitions are stored in tables, called members, in partitioned datasets. Definitions are activated by scheduling or ordering them to an active environment, which can be a file or memory, depending on the product. Only then can the product process these definitions.

The different types of automated processing definitions are described in the following sections.

### Jobs

Job scheduling definitions are used by Control-M to handle job processing. They can be defined for jobs, started tasks, and so on. Each job scheduling definition indicates scheduling criteria and/or conditions to be met before Control-M schedules or submits a particular job. Each definition also indicates actions to be performed by Control-M after the job terminates. Control-M can perform different post-processing actions, depending on the execution results.

Control-M/Restart parameters and statements are also defined in Control-M job scheduling definitions.

## Missions

Missions are used by Control-D and Control-V to determine actions to be performed on job output. When a mission's scheduling criteria are met, the actions indicated by the statements in the mission definition are performed.

Missions are used by Control-M/Analyzer to define scheduling criteria to be applied to Control-M/Analyzer rules that indicate actions to be performed.

## Rules

Rules are used by Control-O, Control-M/Tape, the Control-M Event Manager (CMEM), and Control-M/Analyzer to respond to specified events, such as the detection of a message by Control-O. The occurrence of the specified event triggers the rule that results in the performance of the actions specified in the rule.

Scheduled rules remain active in memory after the performance of the rule. They can be triggered each time an occurrence of the specified event is detected. There is no limit to the number of times a rule can be triggered.

Control-M/Analyzer rule definitions contain only action statements. Control-M/Analyzer rules are either executed upon request without regard to scheduling criteria, or according to scheduling criteria specified in a Control-M/Analyzer mission.

## Monitors

Monitors are started tasks that perform IOA functions. There are two types of monitors—IOA monitors and product monitors.

For instructions on activating and deactivating each monitor, see the user guide for the relevant INCONTROL product.

The following sections briefly describe each monitor and its functions.

### IOA Monitors

IOA monitors perform tasks that can be initiated from any of the INCONTROL products.

#### IOA Online Monitor (IOAOMON)

The IOA Online monitor interacts with various environments, such as CICS, to provide the online interface for IOA applications. The IOA Online monitor generates the INCONTROL product screens and handles all IOA Online functions.

This monitor usually operates 24 hours a day as a started task is usually activated automatically as part of the IPL process.

For more information, see [IOA Administration](#) (on page 35).

## IOA VTAM Monitor (IOAVMON)

The VTAM monitor (IOAVMON) enables access to the IOA Online monitor for VTAM users without passing through any TP monitors, such as CICS or IMS/DC.

## IOA Functional Monitor (IOAFMON)

Control-M/Tape uses the IOA Functional monitor to process certain action statements, such as DO CONDITION and DO SHOUT.

When an event such as a volume being checked in or a dataset being created occurs, and that event requires execution of an action statement using the Functional monitor, the Control-M/Tape component writes a trace record that describes the needed action. The IOA Functional monitor reads the Control-M/Tape Trace file and processes the specified records.

This monitor also accepts requests to be passed to robot tape libraries, and processes them. For more information, see the Control-M/Tape User Guide, and the IOA chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

## IOA Archive Server Monitor (IOASMON)

The Archive server enables Control-V users to view and print reports that have migrated to non-DASD media.

## IOAGATE (IOA Gateway Monitor)

IOAGATE is used by various application servers including the Control-M Application Server (CTMAS), Control-D/Page On Demand facility (CTDAS), and the Control-O Application Server (CTOAS). For information about IOAGATE hardware and software requirements and about installing IOGATE for communication support to Control-D and Control-O, see the IOA chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

## Product-Specific Monitors

Specific product monitors are responsible for many of the automated operations performed by each product.

### Control-M

The Control-M monitor scans its active environment file and other files to determine when jobs are submitted. It submits jobs, tracks their execution and analyzes the results.

If Control-O is not installed and the Control-M CMEM facility is active, a CMEM monitor processes CMEM rules that were triggered by events in the system.

### Control-O

The Control-O monitor processes rules that were triggered by events in the system and records statistics on rule activation and message detection.

If Control-M is installed, the Control-O monitor also assumes responsibility for processing CMEM rules.

## Control-D and Control-V

Control-D activates two monitors, the Control-D monitor and the Printers Control monitor. The Control-D monitor scans its active environment file and other files to determine when missions are processed. It processes missions, tracks their execution and analyzes the results.

If Control-V is installed, this monitor also handles indexing of reports and their migration to other storage media, such as optical storage or cartridges.

The Control-D Printers Control monitor creates subtasks for each print mission, thus enabling parallel execution of print missions.

If Control-D/WebAccess Server is installed, the Control-D file Transfer monitor can transfer Control-D/WebAccess Server packets from the mainframe to the PC. This monitor scans the Active Transfer file and determines which packets are transferred. [Control-D and Control-V](#) (on page 366) describes the File Transfer monitor.

The Control-D Application server provides access to Control-D and Control-V User Report files by Control-D/Page on Demand. It is activated by the IOA Gateway monitor. For more information, see [Control-D and Control-V](#) (on page 366).

## Daily Processing and New Day Processing

For most INCONTROL products, there are a number of tasks that are performed each day. Typical daily tasks are

- updating the active file or memory environment with definitions for the new day
- checking files for integrity and validity
- producing general reports that describe the actions taken during the previous day
- housekeeping and cleaning unneeded information from product and IOA files

These tasks are performed automatically using the New Day procedure for each product. The New Day procedure is a program that automates daily maintenance tasks and automatically schedules processing definitions for each day.

For a description of the New Day procedures and User Daily jobs for a specific INCONTROL product, see the relevant chapter (for example, [Control-M](#) (on page 193)).

## File Management

There are two major ways to classify files used by INCONTROL products:

- according to access method
  - files managed using a common internal access process called the IOA Access Method
  - files managed using standard access methods
- according to usage
  - IOA Core files that are shared among INCONTROL products
  - product repository files that are exclusively used by a particular INCONTROL product



## IOA Access Method

Certain INCONTROL products have files that are managed using an internal file access process called the IOA Access Method.

IOA Access Method files are sequential datasets with an indexed, or keyed, file structure that offers enhanced data integrity. They are managed (for example, allocated, formatted, and accessed) using a special set of IOA utilities. For more information, see the *INCONTROL for z/OS Utilities Guide*.

Most IOA Access Method files consist of two separate sequential datasets:

- a data component, where the actual information resides
- an index component that provides keyed access to records in the data component

Some IOA Access Method files contain only an index or data component.

Both index and data information are stored in a compressed format that reduces I/O processing overhead and improves disk space utilization.

The IOA Access Method provides dual mirror image file support. This mechanism enables a quick recovery of IOA Access Method files if a disk crash occurs on a disk that contains IOA Access Method primary files.

For a description of the IOA Access Method, see [IOA Administration](#) (on page 35).

## IOA Core

The IOA Core is a collection of files that are shared by all INCONTROL products at your site. The following files comprise the IOA Core:

- [IOA Log File](#) (on page 25)
- [IOA Conditions File \(CND\)](#) (on page 26)
- [Manual Conditions File](#) (on page 26)
- [Calendar Tables](#) (on page 26)
- [Variable Database Files](#) (on page 27)

## IOA Log File

Contains messages generated by INCONTROL products. Messages can be viewed using option 5 in the IOA Primary Option menu. The IOA Log file is cyclic. The maximum number of messages that can be stored in (specified in an installation parameter). Each new entry in the IOA Log file overwrites the oldest existing entry if required.

For a description of the IOA Log file for a specific INCONTROL product, see the online facilities chapter in the relevant user guide.

The IOA Log file can be indexed by the Control-M ORDER ID of the job. The corresponding Index file should be a separate file. The use of the Index file is optional, and can be activated or deactivated dynamically by the IOA administrator.

## IOA Conditions File (CND)

The CND contains information on the status and availability of conditions system-wide. IOA conditions and resources can be viewed using option 4 in the IOA Primary Option menu. The following information is included in this file:

- Prerequisite conditions are user-defined conditions set as either "in conditions" (using IN statements), or "out conditions" (using OUT and/or DO COND statements), in job, rule, and mission definitions
  - When a condition is defined as an "out condition", it is set in the IOA Conditions file during or following the processing of the job, rule, and mission.
  - When a condition is specified as an "in condition", the condition must exist in the IOA Conditions file before the job, rule, and mission can be processed.
- Prerequisite conditions can be used to make the execution of one job, rule and mission dependent on the execution of another. For example, a job with a particular "in condition" cannot be submitted until a job with the same condition specified as an "out condition" was executed and set the condition.
- Prerequisite conditions can also be used to indicate that a required manual operation has been performed.

For more information regarding the use of the IOA Conditions file, see the online facilities chapter of the relevant product user guide.

## Manual Conditions File

This file contains prerequisite conditions that must be added manually. These include conditions that are required by jobs in the active environment but that are not automatically added by other jobs in the active environment. Typical manual conditions are based on events such as "tape has arrived" or "input has been verified".

## Calendar Tables

Calendars determine on which days automated process definitions (jobs, rules and missions) are processed. Calendars can be used to simplify the definition of scheduling criteria.

IOA calendars are organized on a yearly basis. Each calendar lists all the days in a specified year with an indication that an automated definition is or is not processed that day.

Each calendar is assigned a unique name. The calendar name can be specified using Basic Scheduling parameters of an automated processing definition.

Calendars can be defined as either regular or periodic:

- Regular calendars contain schedules that can be easily defined using Basic Scheduling parameters. These calendars consist of scheduling dates or days (of the week) that can be fixed according to monthly patterns.

Regular calendars are especially useful when a large number of jobs have the same schedule. Defining the schedule once in a calendar and specifying the calendar name in the automated processing definitions with that schedule makes it unnecessary to individually define that schedule in each definition.

- Periodic calendars are especially useful when basic scheduling criteria do not conform to fixed date or day of the week or month breakdowns. For example, you may need to schedule a particular job every ten days regardless of date.

For a description of the IOA Calendar facility for a specific INCONTROL product, see the online facilities chapter of the user guide for that product.

## Variable Database Files

Set of three files describing information in IOA variable databases, which are accessible using option IV in the IOA Primary Option menu. IOA variable database files are managed using the IOA Access Method.

## Product Repositories

Each INCONTROL product uses a variety of different files to accumulate information about its operations. These files are referred to collectively as product repositories, regardless of their access method. The table below describes some of the files in the repository of each INCONTROL product. For more information about the repository for each product, see the introduction chapter of the relevant user guide.

In addition to the following list, libraries and tables that contain automated process definitions for each INCONTROL product are also part of each INCONTROL product repository.

For more information regarding the user of the Control-M Resources file, see the chapter that discusses job production parameters in the *Control-M for z/OS User Guide*.

**Table 3 Control-M Repository Files**

File	Description
Active Jobs file	The Control-M active environment contains copies of the ordered job scheduling definitions and the status of those jobs. Accessible using option 3 in the IOA Primary Option menu.  The Active Jobs file must not be placed under the control of a product that does not support BDAM file structure, such as Hiperbatch or DLF.
Journal files	The Journal files include the log of Control-M events (JRNL) and base images of files at the time of the New Day Procedure (CKPJNL and CNDJNL). Together, the Journal files enable you to restore your Active Jobs files in case of a problem.
Job Statistics file	Job execution statistics, such as elapsed time for each job. Updated using utility CTMJSA. Accessible using option S in the Active Environment screen, which is accessed using option 3 in the IOA Primary Option menu.

File	Description	
Job Network file	Dependency information about jobs in the Active Jobs file. Accessible using option N in the Active Environment screen, which is accessed using option 3 in the IOA Primary Option menu.	
Resources file (RES)	The Control-M Resources file contains information on the status and availability of resources system wide. Resources and conditions can be viewed using option 4 in the IOA Primary Option menu. The following types of resources are included in this file:	
	Quantitative	<p>Quantity of a resource in the system. Different jobs may require different quantities of specific resources. For example, a job may require two tape drives.</p> <p>Specification of Quantitative resource requirements for a job provides a solution for the allocation of quantitative computer resources, including, for example, cartridge drives, CPU utilization, database access rate. Specification of Quantitative resource requirements increases computer throughput by controlling access to these resources, thus preventing execution bottlenecks.</p>
	Control	<p>Shared or Exclusive usage of a specific resource. Some jobs may require a resource to be in a specific mode. For example, a backup job may require exclusive access to a specific dataset.</p> <p>Specification of Control resource requirements for a job or mission provides a solution for the problem of resource sharing between different jobs. The Exclusive or Shared mode in which a Control resource is required by a job is also specified.</p> <p>IOA considers the mode of resource usage required when allocating Control resources and prevents jobs whose resource usage is incompatible from executing simultaneously.</p>

**Table 4      Control-D and Control-V Repository Files**

File	Description	
Active Missions file	The Control-D and Control-V active environment contains copies of pending, executing and recently executed missions, and mission status. Accessible using option A in the IOA Primary Option menu. Managed by the IOA Access Method.	
User Report List files	Information about reports sent to a specific user. Reports can be selected for Online Viewing, deleted, and transferred to other users. Accessible using option U in the IOA Primary Option menu. Managed by the IOA Access Method.	
	Types of User Report List files:	
	Permanent	A list of all reports defined to Control-D.
	Active	Recently or soon to be processed reports.
	Migrated	Reports migrated from DASD to various storage devices (Control-V only).
	History	Reports backed up on tape or cartridge.
Active Transfer file	Information about packets that are scheduled for transfer to a PC. Only relevant for sites with Control-D/WebAccess Server. Accessible using option F in the IOA Primary Option menu.	

**Table 5 Control-O Repository Files**

File	Description
Message Statistics file	List of all messages and commands detected in the system, and various information about messages. Examples include frequency, and whether the messages were suppressed. Accessible using option OM in the IOA Primary Option menu.
Automation log	Automation information about all input available to Control-O: <ul style="list-style-type: none"> <li>▪ Console, IMS, and CICS messages and commands.</li> <li>▪ Control-O internal messages.</li> <li>▪ Control-O rule traces.</li> </ul> The Automation log can be accessed using option OL in the IOA Primary Option menu.
Global Variables library	List of all user-defined Global variables. The members of this library are loaded when Control-O is started. These members can be defined or updated using various operator commands. A backup sequential file with the .COPY suffix also exists under the name of the specified Global Variables library.
Global Variables Database	List of all user-defined Global variables. The pools are stored in the IOA Global Variables Database files and are loaded when Control-O is started. These databases can be defined or updated using various operator commands. See IOA Core.

**Table 6 Control-M/Analyzer Repository Files**

File	Description
Active Balancing file	List of all Control-M/Analyzer missions loaded during the Control-M/Analyzer New Day procedure and information about rule status. Accessible using option BB in the IOA Primary Option menu.
Control-M/Analyzer Report file	Detailed information (Balancing report) about each invoked Control-M/Analyzer rule. Accessed using option R in the Rule Activity screen (option BA).
Database files	Information about each Control-M/Analyzer Database variable. The Database tracks the generations, or previous and current values, of each variable.

**Table 7      Control-M/Tape Repository Files**

File	Description
Media Database	Information on all datasets and volumes managed by Control-M/Tape.
Trace file	Record of activities in the Control-M/Tape environment. Used primarily for recovery of the Media Database.
Stacking Database	Statistical information on each dataset that is used by Control-M/Tape to estimate the amount of space required for that dataset. Information about previous generations of the dataset is used to calculate space requirements for storage of each dataset as well as to calculate the average life span of the dataset (non-specific retention criteria). Information used to calculate the average life span of the dataset include catalog, date since last access, and so on.

Statistical information can be extracted from repository files using various utilities and KeyStroke Language (KSL) reports:

For a description of the utilities, see the *INCONTROL for z/OS Utilities Guide*.

For a detailed description of information extraction using KSL reports, and sample KSL reports for a specific INCONTROL product, refer to the *KeyStroke Language User Guide*.

## IOA and Product PARM Libraries

A wide variety of IOA and INCONTROL product features utilize PARM libraries. Members of these PARM libraries do not contain sequential line numbers in columns 72 through 80.

## Miscellaneous

### Dynamic Destination Table

The IOA Shout facility allows the user to specify messages to be sent to particular destinations upon the occurrence of specified events. However, it may be necessary to send a particular message to several destinations, and/or a particular physical destination may vary depending on time of day or other factors. For example, the TSO logon ID of the shift manager may be different for each shift.

These situations are handled by defining groups of destinations in a Dynamic Destination table. The Dynamic Destination table consists of a site-defined list of logical destination names. For each logical, or group, destination name, a list of physical destinations is defined. The table can include all possible types of Shout destinations, including E-mail, TSO, SNMP trap, and operator consoles.

A logical destination name can be specified for a Shout message. The message, when shouted, is sent to each physical destination defined to the logical location. If the physical location is logged on, it receives the message.

Multiple Dynamic Destination tables can be defined, one of which is defined as the default. This Dynamic Destination Table is loaded when the product-specific monitor, such as the Control-M monitor, is started. A different Dynamic Destination table can be loaded using the operator command. However, only one table can be loaded at time.

Shout messages are directed by the product-specific monitor to the Dynamic Destination table in memory.

When a change is made to the Dynamic Destination Table in memory, and it is desired that the change be implemented immediately, the table is reloaded into each product's memory. For information about loading and reloading Dynamic Destination tables in memory, see [IOA Administration](#) (on page 35).

## Mail Destination Table

The IOA Shout facility allows the user to specify messages to be sent to particular destinations upon the occurrence of specified events. These events include to mail destinations and distribution lists.

These situations are handled by defining e-mail addresses and distribution lists in a Mail Destination table. The Mail Destination table consists of a site-defined list of logical e-mail destination names and e-mail distribution lists. For each logical, or group, e-mail destination name, a list of e-mail address destinations is defined.

Multiple Mail Destination tables can be defined, one of which is defined as the default. This Mail Destination table is loaded when the product-specific monitor, such as the Control-M monitor, is started. A different Mail Destination table can be loaded using operator command.

Shout messages are directed by the product-specific monitor to the Mail Destination table in memory.

When a change is made to the Mail Destination Table in memory, and it is desired that the change be implemented immediately, the table is reloaded into each product's memory. For information about loading and reloading Mail Destination tables in memory, see [IOA Administration](#) (on page 35).

## SNMP Destination Table

The IOA Shout facility enables the user to specify messages to be sent to particular destinations, including SNMP destinations, upon the occurrence of specified events. These situations are handled by defining SNMP IP addresses in an SNMP Destination table, which consists of a site-defined list of SNMP IP addresses and logical SNMP destination names. The list defines the following items for each SNMP address:

- IP address
- logical or group
- SNMP destination name

Multiple SNMP Destination tables can be defined, one of which is defined as the default. This SNMP Destination table is loaded when the product-specific monitor, such as the Control-M monitor, is started. A different SNMP Destination table can be loaded using operator commands.

Shout messages are directed by the product-specific monitor to the Dynamic Destination table in memory.

When a change is made to the SNMP Destination Table in memory, and the change should be implemented immediately, the table is reloaded into memory for each product memory. For information about loading and reloading SNMP Destination tables in memory, see [IOA Administration](#) (on page 35).



## AutoEdit Facility

The AutoEdit facility uses AutoEdit variables to enable symbolic representation of dynamic values, such as values that change from execution to execution, or from day to day. Each variable is resolved at the appropriate time, and the resolved value is substituted for the variable. Special AutoEdit functions and control statements enable manipulation of values specified for these variables. The variables can be used in job, rule and mission definitions in various ways allowing flexibility and high level logic in automation of your work environment.

In addition, AutoEdit variables and functions can be used in different ways for each INCONTROL product. The AutoEdit facility can be especially useful in

- JCL setup of jobs submitted under Control-M
- messages issued with the IOA Shout facility
- report scripts written in the KeyStroke Language (KSL)
- KeyStroke OpenAccess scripts used by Control-O to interact with VTAM applications

For information about using the AutoEdit facility with the products at your site, see the relevant user guides.

The dollar sign (\$) is a reserved prefix of IOA AutoEdit variable names.

## Security Implementation

INCONTROL products can be protected just like any other data center application. IOA has built-in interfaces to widely used security environments, such as RACF, CA-ACF2 and CA-TOP SECRET. Each IOA function is associated with a security module. These security modules are used to check user authorization for requested actions, and to permit or deny the actions accordingly. User exits are invoked before the security modules to allow the user to perform required user functions that are not related to security.

For a detailed description of IOA security, see the *INCONTROL for z/OS Security Guide*.

## User Exits

IOA user exits can influence the continued operation of an INCONTROL product at specific points in processing. For example, an exit can check user authorization for a specific action or modify report banners and indexing before printing.

For a description of exits, see 2 Exits. Detailed information about each exit is provided at the beginning of each default user exit source member in the IOA SAMPEXIT library.

## Utilities

Utilities are specialized programs designed to perform specific tasks in the INCONTROL product environment. Some utilities are used with all INCONTROL products and some are product-specific.

For a description of most INCONTROL product utilities, see the relevant chapter in the *INCONTROL for z/OS Utilities Guide*. (The introduction chapter includes a list of these utilities). For a description of utilities not described in the *INCONTROL for z/OS Utilities Guide*, see the user guide of the relevant product.

For a description of online utilities, see the online facilities of the relevant user guide.

## Simulation

Prior to running a complex task for the first time, or during a conversion from another product, it is often useful to be able to first perform the task, or conversion, in simulation mode. For this reason, certain INCONTROL products and utilities can be run in simulation (TEST) mode.

In simulation mode, the INCONTROL product or utility does not affect your system, but does generate information that is useful for checking performance.

## Cross Product Communication

Certain INCONTROL products can perform actions in response to information received from another INCONTROL product.

The following sections describe some ways in which INCONTROL products can interact:

### File Access

IOA Core files are accessed by more than one product. A change made in one of these files by one product can then be read by another INCONTROL product. For more information on files shared by INCONTROL products, see the description of the IOA Core.

**EXAMPLE:** A prerequisite condition set by Control-O is detected by Control-M during its next scan of the IOA Conditions file. As a result of the detected condition, Control-M can then run a job whose execution is dependent on this condition (that is, the condition is specified in the job's IN parameter).

### Automated Processing Definition Statements

Some statements in automated processing definitions, such as job scheduling definitions, can be used by one INCONTROL product to directly influence the operation of another INCONTROL product.

**EXAMPLE:** The DO FORCEJOB statement can be used by other INCONTROL products to instruct Control-M to force, or unconditionally schedule, a specified job.

Parameter CTB STEP specified in a job scheduling definition can trigger a Control-M/Analyzer rule.

### Special CrossProduct Interfaces

Some INCONTROL products have special interfaces to other INCONTROL products installed at the same site. For a discussion of interfaces for specific combinations of INCONTROL for z/OS products, see the relevant chapters.

**EXAMPLE:** Control-M/Restart has a special driver exit that it uses to interface with Control-M/Tape.

# IOA Administration

## Overview

This chapter describes the customization facilities available within IOA, including:

- IOA online environment
- destination tables
- expanding IOA files
- problem Determination
- TSO/ISPF

## IOA Online Environment

The Online facility can be activated under, and supply services to, the following environments:

- TSO (native)
- VTAM
- TSO/ISPF
- IMS/DC
- ROSCOE/ETSO
- IDMS/DC
- CICS
- COM-LETE

Options for cross-memory interfaces to the Online monitor address space are available under native TSO and ROSCOE/ETSO.

There are slight differences in the operation of the Online facility under different environments.

The following topics describe how the IOA Online monitor facility provides support for various environments using CICS as a model scenario. The description also applies to the following environments:

- IMS/DC
- VTAM
- COM-LETE
- IDMS/DC
- ROSCOE Cross-Memory Interface
- TSO Cross-Memory Interface

## Entering the IOA Online Facility

In TSO and ISPF, the IOA Online facility is entered by running a CLIST (located in the IOA CLIST library). The CLIST calls IOAONL, which is the main CLIST that activates the Online facility in the specified environment.

The following CLISTs are provided for activating the IOA Online facility in the indicated environment:

**Table 8 CLISTs for Activating the IOA Online Facility**

CLIST	Environment
IOATSO	TSO environment.
IOAISPF	ISPF environment.
IOAXTSO	TSO through Cross-Memory services.

The CLIST format used to activate the IOA Online environment under ISPF or TSO is:

```
IOAONL APPLTYPE(atype) [TRANID(transmem) ]
```

- *atype* is the type of environment under which IOA is run. Valid values are I (ISPF), S (TSO) and X (Online monitor).
- *transmem* is the name of the relevant transaction member in the IOA PARM library. Maximum length: four characters. Optional.

If no transaction member is specified, a full list of all options for the installed products is displayed.

For more information see [Transaction Members](#) (on page 43).

**EXAMPLE:** At a site where Control-M and Control-D are installed, the following CLIST enables all options for Control-M and Control-D under TSO: `%IOAONL APPLTYPES`

Dataset allocation for the IOA Online environment can be customized using specification of overriding or alternative Allocation members in the CLIST used to activate the IOA Online environment. For more information, see [Allocation Members](#) (on page 46).

**EXAMPLE:** You can pass a transaction ID directly as a keyword parameter to either the IOATSO or IOAISPF CLISTs. For example, `IOATSO TRANID(DMAN)` activates the IOA environment under TSO, setting up only the IOA and Control-D options regardless of other products installed at the site (where transaction member DMAN contains the appropriate statements).

**EXAMPLE:** The following CLIST and transaction member combination enables only option U of Control-D under ISPF (where transaction member DOLV contains the appropriate statements). In the CLIST library: `%IOAONL APPLTYPE(I) TRANID(DOLV)`

## IOA Online Monitor

The IOA Online monitor interacts with different environments (for example, CICS) to provide an online interface for the various IOA applications. The IOA Online monitor generates the INCONTROL product screens, which are available to users signed on to the monitor, and handles all IOA online functions.

Each IOA Online monitor usually operates 24 hours a day as a started task. The IOA Online monitor is usually activated automatically as part of the IPL process.

## Principles of Operation

To enable the same user interface to be activated by users under different environments, a virtual environment is built for each user. This virtual environment handles all actions a user requests to perform in the IOA environment. Therefore, any environment being used at a site can be supported by adding a customized routine to convert the virtual environment to the site's environment.

A special started task, named the IOA Online monitor (IOAOMON), provides an environment for executing IOA applications. One or more IOA Online monitors can be started and each monitor can support several virtual environments (signed-on users).

Each monitor can customize INCONTROL product screens, constants, messages, colors, commands and PFKey definitions to adapt them to the site's requirements. It is recommended that the same prefix be used for each group of monitors that are customized for specific functions. For more information, see the description of member IOAXPRM in the *INCONTROL for z/OS Installation Guide: Installing*.

In addition to site-wide Global profile customization, each INCONTROL product can be customized to respond differently to individual users signed on to the IOA Online monitor through variables specified in User profiles.

In the CICS environment, a small conversational transaction communicates with the IOA Online monitor using cross-memory services. The CICS transaction receives a screen from the user terminal and passes the screen to the IOA Online monitor for processing. The IOA Online monitor returns a screen (to be displayed) to the CICS transaction that in turn sends this screen to the CICS user at the terminal. Using this method, the IOA application is performed outside CICS and the normal CICS function is uninterrupted. The memory requirement of each user in the CICS region is approximately the size of the screen (that is, 2x24x80=3840 bytes).

The IOA Online monitor activates each user as a subtask. Therefore, in the event of an error or abend of a user application, other users working under the IOA Online monitor are not affected.

IOA applications work above and below the 16MB line. Therefore, region size limits may restrict the number of users who can work concurrently under the same online monitor. However, it is possible to open any number of additional IOA Online monitors. Each online monitor must have a different name. The general naming convention that is supplied is

---

IOAOMONx

---

x can be any valid job name character, a different one for each online monitor.

When a user enters the IOA CICS transaction code, the IOA CICS application searches for a free space in one of the currently active IOA Online monitors. The process of choosing a monitor is transparent to the CICS user. Using this method, there is no limitation on the number of users signing on to IOA.

It is possible to balance the workload of two or more IOA Online monitors. For more information see the **BALANCE** parameter in the IOA installation chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

The actual number of users under one monitor varies according to their memory requirements (influenced by how many screens they use concurrently, what type of IOA options they are using, and so on). Many options exist in the IOA Primary Option menu. However, there is no reason for every user to access all options of each product. It may be desirable to limit access to certain options to only a selected group of users. This is done by passing a transaction code to the Online monitor. For more information, see [Transaction Members](#) (on page 43). It is also possible to determine that certain monitors allow users to sign on only with specific transactions thus enabling monitors to be specialized for different groups and numbers of users.

The Control-D Online Viewing facility runs mostly above the 16MB line. Therefore, it is possible to activate about 70 Online Viewing users under one monitor. However, these users are limited to Online Viewing transactions only. This can be done by forcing users to sign on with the transaction ID DOLV.

A data center can run more than one CICS in the same computer. From the IOA point of view, this is transparent to the user. The IOA Online monitor always returns the screen to the CICS that issued the request. It is possible to define additional transaction IDs for local use (for example, a transaction ID offering all options of the menu except for the IOA Conditions/Resources screen). For more information, see [Customizing the IOA Online Environment](#) (on page 43).

## Activating the IOA Online Monitor (IOAOMON)

Each IOA Online monitor usually operates 24 hours a day as a started task. Usually the IOA Online monitor is automatically activated as part of the IPL process by the following operator command:

---

IOAOMONx

---

where x is the monitor ID.

The names of the online monitors available in a site are defined in member IOAXPRM in the IOA PARM library. For details, see [Customizing the IOA Online Environment](#) (on page 43).

If the IOA Online monitor is successfully activated, the following message is displayed on the operator console:

---

```
CTM777I monitor-name ONLINE MONITOR INITIALIZATION STARTED
```

---

After a few seconds the following message is displayed:

---

```
CTM778I monitor-name ONLINE MONITOR INITIALIZATION COMPLETED
```

---

If you try to activate more than one IOA Online monitor with the same monitor ID in the same computer, the newly-activated monitor immediately shuts down and a relevant message is issued.

The IOA Online monitor uses cross-memory services to communicate with other address spaces requesting services. Like other address spaces using cross-memory services, whenever the IOA Online monitor is shut down, the address space entry in the MVS Address Space Vector Table (ASVT) remains non-reusable until the next IPL, and the message IEF352I is issued (in some MVS versions). If the IOA Online monitor is brought up and down many times, the ASVT may become full. New address spaces do not start, and an immediate IPL may be required.

To prevent this problem, specify a large enough value in MVS initialization parameters MAXUSER, RSVSTRT and RSVNONR in member IEASYSXX in the SYS1.PARMLIB library.

For information about these parameters, see the MVS Initialization and Tuning Reference Manual.

## Controlling the Online Monitors

The IOA Online monitor supplies online services to many users. Therefore, it is necessary to control "what is happening inside" each monitor. The following sections describe a series of operator commands that enable such control.

### Displaying a List of All Active Users

Enter operator command: F IOAOMON $x$ ,DISPLAY.

where  $x$  is the monitor ID.

The following list is displayed on the operator console from which the modify command was issued:

---

```
CTM645I  MONITOR USER PGM  TRANID  TERMINAL  START
LASTUSED  ST
CTM646I  monitor user pgm tranid terminal start last status
```

---

Message CTM646I is displayed for every user in the IOA Online monitor, and contains the following data for each user:

**Table 9 Data in Message CTM646I**

Data	Description
MONITOR	Name of the IOA Online monitor.
USER	User ID.
PGM	Name of the program that is active.
TRANID	Transaction ID. For details, see the <i>INCONTROL for z/OS Installation Guide: Installing</i> .
TERMINAL	Terminal ID under the IOA Online monitor.
START	Start time (the hour and minute the user entered the Online facility).
LAST USED	The last time the user performed an action with the Online facility (Format: hour.minute.second).
ST	Status: <ul style="list-style-type: none"> <li>▪ W (Waiting) - Waiting for input (from the terminal).</li> <li>▪ A (Active) - Active. Working.</li> <li>▪ T (Terminating) – User session is terminating.</li> </ul>

## Displaying a List of All Active Datasets and DD Statements

To display a list of all active datasets and DD statements, specify the following operator command:

```
F monitor_name,LISTDD
```

The following information is displayed on the operator console from which the modify command was issued:

**Table 10 Information Displayed on Operator Console**

Information	Description
DD STATEMENT	DD statement names for all datasets currently allocated to the monitor.
DATASET	Names of all datasets currently allocated to the monitor.



## Displaying a Detailed Storage Map

To display a detailed storage map by TCB storage key and subpool, specify the following operator command:

```
F monitor_name,LISTVDET
```

Every allocated block is listed by TCB and subpool number. The following information is displayed on the operator console from which the modify command was issued:

**Table 11 Detailed Storage Map Information**

Information	Description
TCB	TCB.
SUBPOOL	Subpool number.
FROMADDRESS	Address from which the dataset is allocated.
LENGTH	Size of the dataset (both above and below the line).

## Displaying a Summary Storage Map

To display a summary storage map, specify the following operator command:

```
F monitor_name,LISTVSUM
```

Totals for all allocated blocks are listed.

## Canceling an IOA Online Monitor User

To cancel a specific user who is currently active under the IOA Online monitor, enter operator command:

```
F IOAOMONx,CANCEL USER=userid
```

where *x* is the monitor ID.

As a result, the user application is terminated and the following message is displayed on the operator console from which the modify command was issued:

```
CTM795I monitor-name USER userid CANCELED
```

## Deactivating the IOA Online Monitor

To deactivate the IOA Online monitor, use operator command:

```
P IOAOMONx
```

where *x* is the monitor ID.

## Using the zIIP processor by the IOA Online Monitor

The ZIIPXBMO parameter is provided in the IOAPARM member for offloading IOA Online Monitor I/O workloads to zIIP with XBM (Extended Buffer Manager). The default is N, that the I/O workloads are not offloaded to zIIP with XBM.

The XBM modify command allows the IOA Online Monitor to activate the offloading of eligible I/O workloads from general purpose processors to zIIP processors with XBM. This way XBM address space can be started after INCONTROL address spaces, without requiring the INCONTROL address spaces to be restarted.

For the IOA Online Monitor, the XBM modify operator command syntax is as follows:

---

```
F IOAOMONx , XBM
```

---

where *x* is the monitor ID.

## Problem determination

BMC provides a number of problem determination facilities for customer assistance. These include the following:

- [Internal Trace facility](#) (on page 178)
- [Identity Level \(IDL\) facility](#) (on page 181)
- [IOA systems comparison facilities](#) (on page 191)

## VTAM Monitor (IOAVMON)

The VTAM monitor (IOAVMON) enables access to the IOA Online monitor for VTAM users without passing through any TP monitors (for example, CICS, IMS/DC). Only one VTAM monitor can be activated at a time.

### Activating the VTAM Monitor (IOAVMON)

The VTAM monitor usually operates 24 hours a day as a started task. The monitor is usually automatically activated as part of the IPL process by operator command:

---

```
S IOAVMON
```

---

The VTAM application is active before starting the VTAM monitor. To activate the VTAM application manually, use VTAM command:

---

```
V NET, ACT, ID=i oaappl
```

---

where *oaappl* is the VTAM major node containing the IOAVMON acbname.

If the VTAM monitor is successfully activated, the following message is displayed on the operator console:

---

```
CTM7A0I monitor-name VTAM MONITOR INITIALIZATION STARTED
```

---

After a few seconds, the following messages are displayed:

---

```
CTM7A1I monitor-name VTAM MONITOR INITIALIZATION COMPLETED
```

```
CTM7ACI monitor-name ACCEPTING LOGONS TO acbname
```

---

## Deactivating the VTAM Monitor

To deactivate the VTAM monitor, use operator command:

---

**P IOAVMON**

---

## Displaying a List of All Active VTAM Users

To display the list of users logged on to IOAVMON, enter operator command:

---

**F IOAVMON, D**

---

The following list is displayed on the console from which the operator command was issued:

---

```
CTM7B0I monitor - TERMINAL TRANSID
CTM7B1I monitor - LUname transid
```

---

## Customizing the IOA Online Environment

All INCONTROL products are accessed using the IOA Online environment. This environment can be customized to meet your site's needs. Using the methods described in this section, you can, for example, modify menus and allocation tables, and control users' access to the various features of the INCONTROL products installed at your site.

The members described in this section reside in the libraries pointed to by DD statement DAPARM. The standard concatenation is the IOA PARM and IOAENV libraries. The IOA PARM library can be customized to meet the site's needs.

## Transaction Members

Transaction members are line-oriented of a transaction member. Each line contains customization information for one of the INCONTROL products installed at the site.

Transaction members can be used to determine

- which products are available to the user.
- which options of each product are available to the user.
- which program member is to be used by the transaction.

The format for each line in a transaction member is:

---

**product [optiona, optionb, . . . optionx] [PGM=pgmlist]**

---

where:

- product is the INCONTROL product described in the line. Valid values are: IOA, CTM, CTR, CTD, CTV, CTT, CTO, CTL and CTB.

Products do not need to be listed in any specific order. Only products listed in the transaction member are made available to the user.

- optiona through optionx are the option codes of options to be displayed, or ALL. The option codes are the one or two character codes that are entered in the command line to indicate choice of a specific option. If ALL is specified, all options of the product described in the line are displayed.
- pgmlist is the name of the Program List member used to activate the INCONTROL product described in this line. For more information, see [Program List Members](#) (on page 44).

Certain transaction names cannot be used for user-defined transaction members. Reserved transaction names are: IOAX, DOLV, KOA, VK, IALL and ECS.

**EXAMPLE:** Member DOLV in the IOAENV library specifies option U of Control-D:

CTD U
-------

**EXAMPLE:** Member DMAN in the IOAENV library specifies all options of IOA and Control-D:

IOA ALL
CTD ALL

**EXAMPLE:** A transaction member that contains only option 3 of Control-M and options 4 and 5 of IOA looks like this:

CTM 3
IOA 4, 5

If a transaction member specifies only one option, once activated, the option is accessed directly without displaying a menu panel. If more than one option is specified, the following options are automatically added to the menu: 0, 1 (in some menus) and X. Therefore, the minimum number of options in a menu member is 4 or 5. Options 0,1, and X do not need to be specified in transaction members and is not specified in PGM members.

## Program List Members

A Program list specifies a member containing a list of programs to be activated for the options of an INCONTROL product. A Program List member exists for each INCONTROL product (including IOA).

The naming convention for Program List members is PGMxxx, where xxx is the product suffix (for example, PGMCTM is the Program List member for Control-M).

Each product has its own program list member that contains all the options of the product. Unless specified otherwise in a transaction member, the product's program list member is used to specify which options of the product are available for users. The PGM list member is used only if the product is installed as specified in member IOAPARM in the IOA PARM library.

Program List members are line-oriented. Each line describes a program in the relevant product.

The format for each line in a Program List member is:

```
program DELETE envir [=]optioncode
```

**Table 12      Format for Program List Member Lines**

Field	Description
<i>program</i>	Program described in the line. If the program has been modified, the name of the new (modified) program is specified here.
<i>envir</i>	A one-character designation of the environments in which the program option is to be available. Valid values: <ul style="list-style-type: none"> <li>▪ I - ISPF</li> <li>▪ R - KSL</li> <li>▪ S - TSO</li> <li>▪ X - Online monitor</li> <li>* - All environments</li> </ul> blank - No environments
=	If specified, the equal sign indicates that this option is accessible from all screens in the IOA environment using the transfer command (for example, =5 transfers the user to the IOA Log screen). If no equal sign is specified, the option is only available from the IOA Primary Option menu.
<i>optioncode</i>	A one or two-character option code used to activate the specified program. To specify a different option code for a program, specify the new option code here. More than one option code can be specified for each program. No two programs can have the same option code.

Changing the option code listed in the Program List member affects only the operation of the program. To ensure that the display shows the new option code, it is necessary to update member MENU in the MSGENG library. For details, see [Customizing the Menu](#) (on page 55).

Option codes for options 0, 1, and X are reserved and cannot be changed.

The following default Program List members are located in the IOAENV library:

- PGMCTB
- PGMCTD
- PGMCTL
- PGMCTM
- PGMCTT
- PGMCTDPC
- PGMCTO
- PGMCTR
- PGMCTV
- PGMIOA

The following is the Sample Program List member for Control-O (member PGMCTO):

```
CTOTOMP DELETE * =OR
CTOTMSC DELETE * =OM
CTOTARF DELETE * =OS
CTOTAOP DELETE * =OA
CTOTALO DELETE * =OL
```

An alternate Program List member can be used to specify a modified version of a specific program (or programs) to be activated for a specific options.

Alternate program lists must contain programs for all available options of the relevant product available to the user.

## Allocation Members

Allocation of files and datasets for each INCONTROL product is specified in Allocation members. The naming convention for Allocation members is ALCxxx, where xxx is the product suffix. Each product has its own Allocation member that contains the allocations that need to be made to access the product using the Online facility.

Two sets of Allocation members are provided in the following IOA libraries:

**Table 13 IOA Libraries Containing Sets of Allocation Members**

Library	Description
IOAENV	When INCONTROL products are first installed, files and datasets are allocated according to the Allocation members in the IOAENV library. This library contains the default Allocation member settings, and can be potentially overridden by periodic maintenance.
PARM	You can also customize allocations at your site by making changes to the set of Allocation members in the PARM library. Modifications to the PARM library enable localization of your INCONTROL product settings.

The IOAENV and PARM libraries contain Allocation members, including

- ALCIOA
- ALCCTM
- ALCCTD
- ALCCTL
- ALCCTV
- ALCCTB
- ALCCTT
- ALCCTO
- ALCCTR

Allocation members consist of blocks of KEY parameters that function as identifiers. These KEY parameters reference DD statement entries in a DSN member (either member IOADSN in the IOAENV library or member IOADSNL in the PARM library) where the actual DD statements and corresponding information are contained.

When allocating, member IOADSNL in the PARM library is searched for the corresponding key. If the key is not located in this member, member IOADSN in the IOAENV library is searched. Therefore, localized corrections override default allocations.

Allocation specifications are contained in both Allocation members and DSN members. This facilitates the maintenance of DD statements in one location, minimizing the risks inherent to maintaining multiple occurrences of the same DD statement.

Allocation members contain conditional statements that are evaluated according to parameters in the PARM members (for example, IOAPARM, CTMPARM) in the PARM library. The datasets specified in a product's Allocation member are only allocated if its conditional statement evaluates to true.

## Allocation Member Format

The format of a key in an Allocation member is:

---

**KEY=keyname**

---

where keyname is the name of the key that points to a DD statement entry by the same name in a DSN member (member IOADSN or IOADSNL). keyname usually matches the DD statement to which it points. Mandatory.

Conditional blocks of execution can be specified using the )SEL and )ENDSEL parameters: If no )SEL parameters are specified, the subsequent allocations (that is, KEY=parameters) apply to all products.

```
)SEL ppp=va l ue
    KEY=keyname
    KEY=keyname
    KEY=keyname
    .
    .
    .
)ENDSEL
*
```

---

**Table 14 Fields for Conditional Blocks of Execution**

Field	Description
)SEL	Indication that the subsequent keys are only used for allocation if the subsequent expression, ppp=value, is true. )SEL must begin in column 1. Optional.
ppp	An installation parameter.
)ENDSEL	Indication of completion of this block of key parameters. Mandatory, if )SEL is specified.
*	In column 1, represents a comment line. Optional.

## Format of a Dataset Entry in a DSN Member

The format of a dataset entry in a DSN member (either IOADSN or IOADSNL) is as follows:



```

DATASET KEY,
      SEQ=N,
      DD=DDNAME,
      DSN=DSNAME,
      MEM=MEMBER[ , ]
      CATALOG=YES|NO[ , ]
      UNIT=unit-name[ , ]
      VOL=volume serial number
      RETRY=retry number

```

**Table 15 Fields for the Format of a Dataset Entry in a DSN Member**

Field	Description
KEY	Name of the identifying key. Mandatory.
SEQ	Sequence number for concatenating libraries and members. To concatenate, specify the same DD statement name with a different sequence number. The concatenation is according to SEQ in ascending order. Optional.
DD	DD statement (typically the same as the name of the key). Mandatory.
DSN	DSN name. Optional.  %variable%s can be specified. These variables are resolved at allocation time according to values in member DEFPARM in the PARM library. The user can change the values in DEFPARM, preferably using the INCONTROL Installation and Customization Engine (ICE).
MEM	Member name. Optional.
CATALOG	Determines whether allocation is performed using the MVS catalog information, or from other sources. Valid values are:  YES – Allocation is performed using the MVS catalog information.  NO – Information is taken from the UNIT and VOL parameters when allocating the dataset.
UNIT	Unit name
VOL	Volume serial number
RETRY	Number of attempts that should be made to allocate the dataset when it is in use by another user. Retries occur at half-second intervals. Valid values are: 1-999. Default: 1

## Format of a Sysout Entry in a DSN Member

The format of a sysout entry in a DSN member (either IOADSN or IOADSNL) is:

```
SYSOUT  key ,
        DD=ddname ,
        CLASS=x ,
        HOLD=YES|NO ,
        FREE=CLOSE
```

**Table 16 Fields for the Format of a SYSOUT Entry in a DSN Member**

Field	Description
key	Name of the identifying key. Mandatory.
DD= <i>ddname</i>	DD statement (typically the same as the name of the key). Mandatory.
CLASS= <i>x</i>	Class name. Mandatory.
HOLD=YES NO	Indication of whether the class is held. YES - Class is held. NO - Class is not held.
FREE=[CLOSE]	Indication of whether MVS frees the resource allocation to this DD statement.  CLOSE - Closed when the dataset is closed. For more information, see the MVS JCL Reference Manual.

**EXAMPLE:** CTMHELP is allocated if any INCONTROL product is installed:

**Table 17 Example of CTMHELP allocation in DSN member**

In Allocation Member	In DSN Member
KEY=CTMHELP	DATASET CTMHELP , DD=CTMHELP , DSN=IOA.V900.MSGENG

To customize allocation at your site, specify one of the following DD statements in the CLIST (or the Online monitor procedure or the KSL) used to activate the IOA Online facility:

**Table 18 DD Statements for Customizing Allocation**

DD Statement	Description
DAOVRALC	<p>Specifies a member containing allocations that override corresponding allocations in the Allocation member list for the relevant product.</p> <p>The datasets specified in the appropriate products in the Allocation member are all allocated. However, any allocations for datasets specified in the overriding member are also allocated and they override the corresponding allocations.</p> <p>CLIST with an overriding Allocation member:</p> <pre> PROC 0 APPLTYPES -           TRANID(TRANSACTION_ID_MEMBER) ALLOC DD(DAOVRALC) -           DSN('IOA.V900.PARM(ALCOVR)') SHR REU %IOAONL APPLTYPE(&amp;APPLTYPE) TRANID(&amp;TRANID) FREE DD(DAOVRALC) END:END </pre>
DAALTALC	<p>Specifies an alternate Allocation member for replacing Allocation members for all products at the site.</p> <p>The alternate list must contain a complete set of all necessary allocations to the environment (that is, not just modified ones) because none of the default Allocation members is used.</p> <p>CLIST with an alternate Allocation member:</p> <pre> PROC 0 APPLTYPES -           TRANID(TRANSACTION_ID_MEMBER) ALLOC DD(DAALTALC) -           DSN('IOA.V900.PARM(ALCALT)') SHR REU %IOAONL APPLTYPE(&amp;APPLTYPE) TRANID(&amp;TRANID) FREE DD(DAALTALC) END:END </pre>

If neither an overriding Allocation member nor an alternate Allocation member is specified, the default Allocation members are used. Overriding and alternate Allocation members can be stored in the IOA PARM library.

Only one overriding or alternate Allocation member can be specified in a procedure (for example, a CLIST). However, multiple overriding and alternate Allocation members can be created at a site for use with different CLISTs and Online monitor procedures.

**Sample ALC Member (ALCCTM)**

```

KEY=DAPASCTM
*
) SEL CTM=Y
KEY=DACKPT
KEY=DAGRPH
KEY=DALI B
KEY=DASTAT
KEY=DAUNI TDF
*
) SEL HI ST=Y
KEY=DAHI ST
) ENDSEL (HI ST=Y)
*
) ENDSEL (CTM=Y)

```

## Modifying IOA Online Facility Commands

Every screen of the IOA Online facility supports a set of commands. It is possible to change the names of these commands or to create synonyms. The commands reside in the IOAENV library in members with the following naming convention:

TxxxCMD1

Active commands member.

where *xxx* is the screen identifier.

When changing the names of these commands or to create synonyms, make sure to make the changes in a member in the PARM library, and not in a member in the IOAENV library.

[E IOA Online Options Cross-reference](#) (on page 807) contains a list of all options, screens and their corresponding command members.

A command member is composed of one header line and any number of command lines. The number at the left of the header line is the total number of command lines in the member. It must be updated when lines are added to or deleted from the command member.

The structure of the command line is:

**Table 19 Command Line Structure**

Columns	Description
1–8	Command name.
25–28	Reserved hexadecimal (unprintable) value. Do not modify.
29–68	Description of the command.
69–72	Reserved hexadecimal (unprintable) value representing the internal command number. Do not modify.

It is possible to change the command name and/or description by typing in the change. To add a synonym (a command that is to have the same effect as an existing command), duplicate the command line, modify the command name on the duplicated line, and add one to the command line counter at the left side of the header line. To delete a command, delete the command line in the member and decrease the counter by one.

## Modifying IOA Online Facility PFKey Definitions

Every screen of the IOA Online facility is associated with a set of PFKeys with preassigned commands. It is possible to change these PFKey definitions. The PFKey assignments reside in the IOAENV library in members with the following naming convention:

TxxxPF01

Active PFKey definition member.

where xxx is the screen identifier. [E IOA Online Options Cross-reference](#) (on page 807) contains a detailed list of all screens and their corresponding PFKey members.

When changing PFKey definitions, make sure to make the changes in a member in the PARM library, and not in a member in the IOAENV library.

A PFKey member is composed of one header line and any number of PFKey definition lines.

The structure of the PFKey definition line is:

**Table 20 PFKey Definition Line Structure**

Columns	Description
1–8	The PFKey or Enter.
9–22	The command assigned to the PFKey.

At least one PFKey or Enter key must be defined as the ENTER command.

## IOA Primary Option Menu

The IOA Primary Option menu displays INCONTROL product options and facilities available to the user. Customizing the menu is usually not required since the menu is dynamically generated according to the options available to the user.

The IOA Primary Option menu is displayed in one of the following formats:

- When less than a threshold number of options is available, options are displayed in Line format. Options are listed one per line on the screen. An option code, the name of the option, and a brief description is listed for each option. Information about the INCONTROL products installed at the site is displayed in the upper right corner of the screen.
- When more than the threshold number of options is available, options are grouped according to product in Box format. In Box format only option codes and option names are displayed. This format enables displaying all INCONTROL products and their options on one screen. Information about INCONTROL products installed at the site is available using the INFO command.

Reducing or increasing the number of available options might change the format in which the Primary Option menu is displayed.

### Line Format Display

----- IOA PRIMARY OPTION MENU ----- (1)		
OPTION ==>		USER N06
		DATE 10. 02. 00
2	JOB SCHEDULE DEF	CTM Job Scheduling Definition
3	ACTIVE ENV.	CTM Active Environment Display
4	COND/RES	IOA Conditions or Resources Display
5	LOG	IOA Log Display
6	TSO	Enter TSO Command
7	MANUAL COND	IOA Manual Conditions Display
8	CALENDAR DEF	IOA Calendar Definition
IV	VARIABLE DATABASE	IOA Variable Database Definition Facility
C	CMEM DEFINITION	CTM Event Manager Rule Definition
COMMANDS: X - EXIT, HELP, INFO OR CHOOSE A MENU OPTION 10. 19. 39		

**Box Format Display**

-----		IOA PRIMARY OPTION MENU		----- (1)	
OPTION ==>				USER	N06
IOA		Control - D/V		Control - 0	
4	COND- RES	A	MISSION STATUS	OR	RULE DEFINITION
5	LOG	M	MISSION DEF	OM	MSG STATISTICS
6	TS0	R	REPORT DEF	OS	RULE STATUS
7	MANUAL COND	T	RECIPIENT TREE	OL	AUTOMATION LOG
8	CALENDAR DEF	U	USER REPORTS	OA	AUTOMATION OPTS
IV	VARIABLE DATABASE	F	PC PACKET STATUS	OC	COSMOS STATUS
		DO	OBJECTS	OK	KOA RECORDER
Control - M & CTM/Restart		Control - M/Analyzer		Control - M/Tape	
2	JOB SCHEDULE DEF	BB	BALANCING STATUS	TR	RULE DEFINITION
3	ACTIVE ENV.	BM	MISSION DEF	TP	POOL DEFINITION
C	CMEM DEFINITION	BV	DB VARIABLE DEF	TV	VAULT DEFINITION
		BR	RULE DEFINITION	TI	INQ/UPD MEDIA DB
		BA	RULE ACTIVITY	TC	CHECK IN EXT VOL
COMMANDS: X - EXIT, HELP, INFO OR CHOOSE A MENU OPTION					16. 20. 21

The menu is displayed according to the order of each product in the menu table, as described in [Customizing the Menu](#) (on page 55). The IOA menu is always displayed, only in Box format, on the left side of the screen. However, changes to other menus affect the arrangement of the options of other products in the menu.

## Customizing the Menu

Options for the IOA Primary Option menu are listed in member MENU in the IOA MSGENG library. This member can be used to modify the information in the menu display. The lines in this member might look like the following:

*	Comment
T*	IOA
T*X	IOA
TM	Control - M
TMR	Control - M & CTM/Restart
TD	Control - D
TDV	Control - D/V
TO	Control - 0
TB	Control - M/Analyzer

TB2 Control - M/Analyzer

TT Control - M/Tape

**Table 21 Customizing the Menu with Member MENU**

Field	Description
T	<p>Lines that begin with the letter T indicate titles that appear at the top of each box in the Box Display Type for the IOA Primary Option menu. Following the letter T is the one letter codes of the products whose options are to be displayed in the box with this title.</p> <p>Example</p> <p>The line shown below indicates the title to be displayed at the top of the box containing Control-M options.</p> <p>TM Control-M</p>
L	<p>Lines beginning with the letter L indicate menu options. The format for an option line in the menu member is as follows:</p> <pre>Lproduct environment optcode optname opt-description</pre> <p>where</p> <ul style="list-style-type: none"> <li>▪ <i>product</i> - INCONTROL product that must be installed for this option to be displayed in the menu. For example, M indicates that the option is displayed when Control-M is installed at the site. I is for IOA.</li> <li>▪ <i>environment</i> - Environment that IOA must operate under for this option to be displayed. Valid environment specifications are: <ul style="list-style-type: none"> <li>o T: TSO</li> <li>o I: ISPF</li> <li>o 0: no environment</li> <li>o *: all environments</li> </ul> </li> <li>▪ <i>optcode</i> - Option code used to activate (choose) the option. The option code can be one or two characters in length and must be the same as the option code for this option in the Program List member in use at your site.</li> <li>▪ <i>optname</i> - Option name. Displayed to the right of to the option code in Box format, and between the option code and the description in Line format.</li> <li>▪ <i>opt-description</i> - Option description. Displayed only in Line format. The description can be modified to aid option identification at your site (for example, it can be translated).</li> </ul>

For more information, see the description in member MENU in the IOA MSGENG library.



## Customizing IOA Screens

Customization of IOA screens can be accomplished in a number of different ways. This section describes the following topics:

- modifying IOA screens and constants
- supporting multiple languages
- customizing IOA display format members
- customizing extended color support

You should back up members before modifying them for customization of IOA screens, and use these backups for KSL scripts.

## Modifying IOA Screens and Constants

IOA screens and constants can be adapted by the user for local language, local site terminology, ease of use, and so on.

IOA screen and constant members are stored in the IOA MSGxxx library, where xxx is a three-character language identifier (for example, ENG for English, GER for German). According to this naming convention, at English speaking sites the library is the IOA MSGENG library.

Throughout this guide, the English version of this library, MSGENG, is referenced. Substitute the appropriate library name where applicable if English is not the language at your site.

The naming convention for these members is:

C<sub>T</sub>xS<sub>yyy</sub>z

**Table 22 Naming Convention for Language Members**

Field	Description
x	Single character indicating the product (for example, M for a Control-M screen)
yyy	Three-character screen identifier
z	Single character indicating the language of the screen (for example, E for English, G for German)

Each member contains definitions for either a screen and its constants, or a set of constants. Definitions are specified as Assembler macro instructions. Each member must be assembled and link edited to create a CSECT and module with a name identical to the screen member name.

A screen is defined by the following macros in the IOA library:

**Table 23      Macros that Define a Screen**

Macro	Description
IOASACT	Start screen and constants definition (one IOASACT macro for each screen definition).
IOASBLK	Start a block of fields and constants.
IOASFLD	Define a field in the screen and constant.
IOASEND	End screen and constant definition (one IOASEND macro for each screen definition).

Each unit of data in an IOA screen is called a block. A block can contain one or more fields.

### Examples

The header block is composed of two or more lines that contain the header line, the command field, the scroll field, and so on.

The following line at the top of the Control-M Job List screen is a block:

```
'====>>>>> TOP OF ACTIVE JOBS LIST <<<<<===='
```

Within each block, the location of the fields can be changed. It is possible to change the length of fields that are defined as skip protected and contain constants. Do not change the length of unprotected data fields unless specifically permitted in the member. The length of a field does not include the attribute byte. The total accumulated length of the fields within a block that describes screen lines remains the same after modifications have been made. This restriction does not apply to blocks used for defining constants.

Each block is line-oriented. The total length of each block must be the number of lines in the block multiplied by the length of the line.

Do not change the location and contents of macros IOASACT, IOASBLK, and IOASEND. Changes can be applied only in the contents (parameters) of macro IOASFLD.

Macro IOASFLD defines a field in the screen. The format is

```
NAME=[field_name,][parameter=value,...]
```

If a name has been specified, do not change it.

**Table 24 Fields for Defining Screen Fields Using Macro IOASFLD**

Field	Description
ATTR= <i>code</i>	Field attributes. Refer to macro CTMSATT in the IOA MAC library.
LTH= <i>m</i>	Length without attribute byte. If not specified, the length of the DATA text is used. The real length of the field is always one more than that specified in the LTH field to account for the attribute byte.
DATA= <i>'text'</i>	The data in the field (if any) in quotes.
PROF=Y   N	Indicates whether the value of the field (when exiting the Online environment) is saved in the user's profile member and used at the next invocation of the environment. Optional.  Valid values: <ul style="list-style-type: none"> <li>▪ Y (Yes)</li> <li>▪ N (No). Default</li> </ul> Note: Not all fields can use profiled values.
COLOR= <i>color</i>	Color of the field.  Valid Values: RED, BLUE, PINK, GREEN, TURQUOISE, YELLOW, WHITE, TURQ and NO.
HILITE= <i>hilite</i>	Highlight technique for the field.  Valid values: BLINK, REVERSE, USCORE and NO.

## Constant Blocks

Blocks used to define constants in SYSIN input DD statements, as part of a message, or as statuses on screens, are different from screen field blocks. You can change the length of the fields, disregarding the "total block length rule." An example is member CTMSAESE, which is used to define parameter syntax of the Control-M AutoEdit Simulation facility.

## Definitions

The following terms are used in describing these topics:

**Table 25 Definition of Terms**

Term	Description
FMID	Function Modification ID. This is the ID of the base function that 'owns' a particular element (usually source elements of type ++PNLENP).
RMID	Replacement Modification ID. This is the ID of the last SYSMOD (function, PTF, USERMOD, and so on) that replaced this element.

## Recommended Steps for Screen Modification

Sources (screen members) of INCONTROL products are modified using an SMP/E USERMOD. Use the following steps to perform this task:

1. Choose a name for a new USERMOD (to be built in the following steps). The name of the USERMOD must be 7 characters in length, must begin with an alphabetic character (that is, not a number or symbol), and must be unique.
2. Create a new member in the IOA CUSTEXIT library with the same name as the USERMOD created in Step 1.
3. Copy the contents of member UMODSRC in the IOA JCL library to the newly-created member. This member contains a skeleton sample for the USERMOD (to be customized in the following steps).
4. Specify the name of the new USERMOD in the ++USERMOD statement.
5. Determine the FMID and the RMID of the screen source using SMP/E Online option 3.2. Specify SRC as the entry-type, and the name of the screen source as the entry-name.  
Specify the FMID in the ++VER statement.  
If the RMID value is not the same as the FMID value, add the RMID value to the ++VER statement using the PRE(rmid-value) parameter.
6. Specify the screen source-name in the ++SRC statement.
7. Copy the contents of the source member to the line immediately after the ++SRC statement. Update the copy to meet your needs.
8. Specify the name of the USERMOD in job UMODRACK in the IOA JCL library. Run the job. This job RECEIVES and APPLY-CHECKS the USERMOD.  
Job UMODRACK must end with a completion code of 0.
9. Specify the name of the USERMOD in job UMODAPP in the IOA JCL library. Run the job. This job applies the USERMOD.  
Job UMODAPP must end with a completion code of 0.

**Example**

1. This example illustrates how to unprotect MEMNAME and MEMLIB fields in the Zoom Screen (3.Z).
2. Locate member CTMSSZME in the IOA MSGENG library.
3. Find the line in which field SSZMMEM is defined. In this line, change ATTR=SPH (skip, protect high) to ATTR=UH (unprotect-high).
4. Find the line in which field SSZMLIB is defined. Make the same change as in step 2 above.
5. Recompile and link-edit this USERMOD into load module CTMTSZM.

## Supporting Multiple Languages

Individual users can display the IOA and INCONTROL product interfaces (screens, help, and so on) in a language other than the primary language defined for the site. The primary language for the site is defined during IOA installation.

To set a language for a specific user, that user issues operator command:

```
SET LANG=xxx
```

**Table 26 Fields for Supporting Multiple Languages**

Field	Description
xxx	Language code for this user's interface. Valid values: <ul style="list-style-type: none"> <li>▪ ENG - English</li> <li>▪ FRA - French</li> <li>▪ GER - German</li> <li>▪ JPN - Japanese</li> </ul>

This setting takes effect at the next IOA session and remains in effect for all subsequent IOA sessions (until a new SET LANG command is issued).

When a user selects a language that is not the primary language, a new DD statement is dynamically allocated called DALANGxxx (where xxx is the selected language). The dataset that is associated with this DD statement is prefixed DAMSGxxx. All format screens (\$\$xxx) and the online help text screens are read from this DD statement. Messages are read from DD statement DAMSG, which contains all necessary message libraries. The typical, compiled screens are loaded from DD statement STEPLIB.

Note: If you also want the setting to apply to messages, so that the LOG file contains messages in several different languages, you should concatenate the MSGxxx library to the DAMSG key in the IOADSNL member in the IOA PARM library.

## Supporting an Additional Language

In addition to the languages supplied on the installation tape, other languages can also be supported. To support another language, perform the following steps. Assume that the three-character code for the new language to support is lng).

1. Create a new library named MSGlng, which contains the translated message and screen members.
2. Concatenate the new message library (MSGlng) to the DAMSG key in member IOADSNL in the IOA PARM library.

In member IOADSNL in the IOA PARM library, add the following entry:

```
DATASET LANGlng,
      SEQ=1,
      DD=DALNG%SLANG%,
      DSN=%ILPREFA%.MSG%SLANG%
```

## Customizing IOA Display Format Members

In certain INCONTROL product screens, it is possible to specify the display type (or format) of the screen. A wide selection of predefined display types is provided. For example, in the Control-D User Report list, display type S is similar to IBM's SDSF, while display type J can be used for production control and by programmers. For details, see the appropriate user guide.

If the predefined display types are not adequate, users can define their own display types using the Display Type Editing facility. This section describes parameters that define new display types or modify existing display types.

Another method for customizing display types is described in Concept.

All display formats are defined in members in the IOA MSGENG library. For a list of these members, see Concept, which contains a list of all the options of IOA, and the screen member and/or format members that are used to build the IOA panels. For example, in Control-D, the display formats of option U are defined in members \$\$FRM and \$\$USR in the IOA MSGENG library. These members contain sets of predefined display formats. When a display type is activated, it first checks for any errors, which are displayed in an appropriate screen.

When the user needs to add new formats or modify existing formats, it is highly recommended that the corrections be made in the \$Lfrm member (instead of the \$\$frm member), where frm is the member name. The \$Lfrm members are for localization purposes, and are not overwritten during product maintenance.

Each line in a format member is one of the line types listed below. The line type must be written in positions 1 through 10 of the line. The permitted line types are

- [@HEADER](#) (on page 65)
- [@LINE](#) (on page 65)
- [@LINE](#) (on page 65)
- [@FIELD](#) (on page 66)
- [@VAL](#) (on page 67)
- [@END](#) (on page 67)
- [@DLM](#) (on page 67)
- [@INCLUDE](#) (on page 68)
- [@DELETE](#) (on page 69)

A line starting with an asterisk (\*) is a comment line.

The parameters on the line characterize the line's attributes. Parameters can be written in positions 11 through 72 of the line. A continuation line is created by leaving the "line type" area blank and using positions 11 through 72 for parameters that describe the line's attributes.

In order to modify or replace an existing display type the following line must exist in the \$Lfrm member before defining the replacement display type:

---

```
@DELETE ID=id; LTH=n; TYPE=type; CLASS=class;
```

---

where *id*, *n*, *type*, and *class* are defined as they appear in the @STYLE statement in the original \$\$frm member which is to be modified or replaced. If this is not done, the following messages are displayed:

---

```
ERROR IN MEMBER - $Lfrm
CTMB1CI - THIS FORMAT ALREADY EXISTS
```

---

The preceding message may also be displayed as  
IOAB1CI – THIS FORMAT ALREADY EXISTS

The following sections describe each line type and its parameters.

## @STYLE

@STYLE is a line type used to start a new display format or a replacement display format. The format for an @STYLE line is:

---

```
@STYLE ID=id; TYPE=type; CLASS=class; [IDLIKE=idlike; TYPELIKE=typelike;
CLASSLIKE=classlike;] LTH=n;
```

---

**Table 27      Format of Fields for @STYLE Line**

Field	Description
ID	Name of the display type. This value can be used to identify the DISPLAY TYPE field in an option's entry panel (if one exists) or when changing the Display Type by specifying the command DISPLAY x (where x is the display type) from the command line. This field must be one character in length only. The value can be any printable character. A blank is not valid. The character '1' is reserved for internal use and is not used for a new display format.
TYPE	Logical type of the display type (second level qualifier). Valid values depend on the screen in which the display type is used. For example, display types of the Control-D User Report List screen use this field for the following file types:  P - Permanent file A - Active file H - History file * - All file types
CLASS	Class of record for which this display type is used. Valid values depend on the screen in which the display type is used. For example, display types of the Control-D User Report List screen have the following record classes:  U - User records S - Sysdata records R - Ruler records * - All record classes
IDLIKE	Name of the display type to which the current ID is identical. TYPELIKE and CLASSLIKE must also be specified. The definition of the display type specified using parameter IDLIKE must precede the current line. When this parameter is specified the current display format has only an @STYLE line, and takes its definition from the specified display format. This field must be one character in length only.
TYPELIKE	Type of the display type to which the current ID is identical. Valid values are the same as in the TYPE parameter.
CLASSLIKE	Class of record for which this display type is used. Valid values are the same as in the CLASS parameter.
LTH	Length of the line to be displayed. Valid values are 80 or 132.



Field	Description
DESC	Descriptive text to display next to the display type in the display resulting from command DI ?. Maximum length: 22 characters. Default: Blank.
	Note: Only the first description for each @STYLE ID is used.

Color, highlight and intensity parameters can also be modified. For more information, see [Color, Highlight and Intensity Parameters](#) (on page 68).

## @HEADER

@HEADER is a line type used to describe the header line of the current display format. The format for an @HEADER line is

```
@HEADER      DATA=data;
```

where data is the actual header data to be displayed as the header line of the screen in which the display type is shown. The header data can be a maximum of 80 (or 132) characters in length. If less data is specified, it is padded with blanks to fill the physical line.

Color parameters can also be modified. For more information, see [Color, Highlight and Intensity Parameters](#) (on page 68).

## @LINE

@LINE is a line type used to start a new line in the current display format. The format for an @LINE line is

```
@LINE      LONG={ Y | N } ; SHOWBLINE={ Y | N } ;
```

**Table 28**      **Format for Fields in the @LINE Line Type**

Field	Description
LONG	Whether the line is displayed in regular screen format (that is, when Additional Information is not requested on the line).  Y (Yes) - Display the line only when ADDITIONAL INFO is selected on the displayed line. (ADDITIONAL INFO is requested by entering A in the line's option field.)  N (No) - Always display the line. Default.
SHOWBLINE	Whether the line is displayed when all fields in it are blank.  Y (Yes) - Show the line. Default.  N (No) - Do not show the line.

Color parameters can also be modified. For more information, see [Color, Highlight and Intensity Parameters](#) (on page 68).

## @FIELD

@FIELD is a line type used to start a new field in the current line in the current display format. The format for an @FIELD line is

```
@FIELD NAME=name; DATA=data; LTH=ln; PREF=pref; KANJI={Y|N}; OFFSET=ofst;  
EDIT={Y|N}; DEFAULTTEDIT={Y|N}; DFLT=dflt; PROFILE=Y/N/name ; AFORCE={Y|N};  
EXPAND=YES;
```

where

- *name* is the field to be displayed. Valid names are listed in the description of the display types of each product.
- *data* indicates that constant data to be displayed. This is useful, for example, for displaying a field descriptor. Either NAME or DATA must be present, but not both.
- *ln* displays the length of the information of the field specified in the NAME parameter, or the display length of the constant information in the DATA parameter. If the actual information provided by NAME or DATA is too short, it is padded with blanks on the right. If the information is too long, it is truncated on the right.
- *pref* is the prefix to be added to the left of the displayed data specified by NAME or DATA.
- KANJI specifies if Kanji (Japanese writing using Chinese characters) input is allowed. Valid values: Y (Yes) and N (No). N is the default.
- *ofst* is the offset in the data field from which data is taken for screen display purposes. This mechanism allows the user to split a long data field between several display fields (possibly on several different lines). *ofst* is the offset from which to start.
- EDIT indicates whether the user can change the displayed field. Valid only if NAME is specified. If Y (Yes), the user can change the displayed field. If N (No), the field is displayed in a protected form. It cannot be modified. N is the default.
- DEFAULTTEDIT indicates whether the user is able to edit an insert record. Valid only if NAME is specified. If Y (Yes), for an Insert record, the field is displayed so that the user can enter initial information for it. If N (No), the field is displayed in a protected (cannot be modified) form. N is the default.
- *dflt* is the default value for the field in an insert line. Valid only if NAME is specified. The data specified is displayed in the field. If DFLT is omitted, the initial value of the field is blank.
- PROFILE=Y/N indicates whether the value of the field (when exiting the Online environment) is saved in the user's profile member and used at the next invocation of the environment. The field name is used as the Profile Variable name. Optional. Valid values: Y (Yes), N (No). Default: N  
 PROFILE=*name* indicates what the value of the field (when exiting the Online environment) is saved in the user's profile member and used at the next invocation of the environment. The name is used as the Profile Variable name. Optional

- AFORCE forces an attribute character before the field. If Y (Yes), forces the character. If N (No), does not force the character. N is the default.
- EXPAND=YES enables a field to expand to its largest possible width based on a 132-column (Type 5) terminal.

Color parameters can also be modified. For more information, see [Color, Highlight and Intensity Parameters](#) (on page 68).

## @VAL

@VAL is a line type used to set the color of the current field according to the value of the field. More than one @VAL line type can be specified for different values of the current field. The first match found between the field's value and the value specified in the @VAL line determines the color of the field. The format for an @VAL line is

@VAL	DATA= <i>data</i>
------	-------------------

where data specifies a data string that is compared to the current value of the field. The data string can contain \* and ? mask characters.

Color parameters must also be specified in the line. In case of a match between the field's current value and data in the @VAL line, the colors specified in the @VAL line override the colors specified in the @FIELD line.

## @END

The @END line type is used to end the definition of the current display format.

## @DLM

The @DLM line type is used to change the currently used delimiter in this member to a new one. The default delimiter is ; This line can be inserted anywhere in the member. The format for an @DLM line is

@DLM=newold
-------------

where new is the new delimiter and old is the old delimiter.

In the @DLM line the new delimiter is specified as the value for the DLM keyword but it is delimited by the old delimiter.

@DLM=, ;	<<----- delimiter first set to ,
@DLM=& ,	<<----- delimiter then set to &
@DLM= ; &	<<----- delimiter set back to ;

## @INCLUDE

The @INCLUDE line type is used to insert the text of a member into the current member (essentially, performing a copy). This line can be inserted anywhere in the member. The format for an @INCLUDE line is

---

```
@INCLUDE=member
```

---

where member is the name of the member to include within the current member.

## Color, Highlight and Intensity Parameters

The @STYLE, @LINE, @FIELD and @HEADER line types support COLOR, HILITE and INTENS parameters. Color takes effect on color monitors only. Highlight takes effect on both color and monochrome monitors. Intensity takes effect on monochrome monitors only.

Valid colors:

- NONE (Default)
- WHITE
- BLUE
- GREEN
- TURQ
- RED
- PINK
- YELLOW

Valid highlights:

- NONE (Default)
- BLINK USCORE
- REVERSE
- DARK

For of monochrome monitors, users can add the INTENS parameter to the @FIELD line type.

Valid intensities:

- LOW (Default)
- HIGH

Users can create a combination of color and highlight or highlight and intensity for each field by specifying COLOR, HILITE and INTENS parameters on the same @FIELD line. The COLOR, HILITE, and INTENS parameters can all be specified on a line. Each takes effect when appropriate.

- If the above parameters are omitted on the @FIELD line, the field inherits those parameters from the @LINE preceding it.
- If these parameters are omitted on the @LINE line, the line inherits those parameters from the @STYLE preceding it.
- If these parameters are omitted on the @STYLE line, they are set to their default values.

@STYLE, @LINE and @FIELD also accept COLOR and HILITEA parameters that have the same values as COLOR and HILITE, respectively. These parameters can be used to specify a set of alternate colors when displaying records: the first record on the screen is displayed with COLOR and HILITE; the second record is displayed with COLORA and HILITEA; the third record with COLOR and HILITE, and so on. This causes an alternating color effect. If COLORA and HILITEA are omitted, the alternate colors are set to the standard color values.

## @DELETE

The @DELETE line type is used to remove or redefine existing styles (after they have been deleted). Whether you simply delete a style, or delete and then modify it, the changes are made in the \$Lxxx member and not in the \$\$xxx member. The format for an @DELETE line is

```
@DELETE ID=id; LTH=n; TYPE=type; CLASS=class;
```

where *id*, *n*, *type*, and *class* are defined as they appear in @STYLE to be deleted or modified.

For example, you can use @DELETE ID=D; LTH=80; TYPE=L; CLASS=L; to prevent users from using the D display type. Once the style is deleted, you can then redefine it for later use.

## Extended Color Support

The following is considered when using the extended color feature of the IOA Online facility:

- [IMS/DC and IDMS/DC](#) (on page 69)
- [IRMA PC Terminal Emulator Users](#) (on page 69)

### IMS/DC and IDMS/DC

IOA does not automatically recognize an IMS/DC or IDMS/DC terminal as supporting extended color attributes. If the IMS/DC or IDMS/DC terminal supports extended color attributes, the ICOLOR=YES parameter must be added to the user's profile. For details on modifying the user's profile, see [Profile Variables](#) (on page 82).

It is important not to use parameter ICOLOR=YES for non-color terminals. Doing so causes an error and the terminal is inhibited.

### IRMA PC Terminal Emulator Users

Early versions of IRMA' (from DCA,) may not interpret the 3270 color stream correctly. Therefore, IOA screens may not appear in the proper colors. If this problem occurs, call your local IRMA representative and request a later version of IRMA that corrects this problem.

## Customizing Extended Color Support

The IOA environment uses extended color support if the terminal is capable of supporting it. Various defaults are set so that if no changes are made, extended color is used wherever possible.

Two VTAM commands can be used to help determine whether a particular terminal supports color:

**Table 29 VTAM Commands for Determining Color Support**

Command	Description
RPQ	When this VTAM command is issued to a terminal, the terminal responds with an indication whether it supports extended color.
	Note: RPQ is a physical command, that is not supported by some older control units.
LOGMODE	LOGMODE is an entry in a VTAM table that logically defines the capabilities of a terminal. The following table indicates whether the capability of the terminal to support extended color is determined by the contents of the VTAM LOGMODE entry:

**Table 30 Color Support by Environment**

Environment	RPQ Default	Suppress Issued By	Force Issuing RPQ	No Extended Color
Native TSO and ROSCOE	RPQ	IOA, if TCOLOR=TERMINAL	TCOLOR=YES or NO	TCOLOR=NO
TSO and ROSCOE (Cross-Memory)	RPQ	IOA		ICOLOR=NO
ISPF	RPQ	ISPF	N/A	LOGMODE
IOAVMON	RPQ	IOAVMON		LOGMODE
IMS/DC and IDMS	ICOLOR not issued			ICOLOR=NO
CICS	RPQ	IOACICS		ICOLOR=NO

In this table, TCOLOR and ICOLOR are IOA Profile variables. For more information about these variables, see [IOA Profiles](#) (on page 78).

For TSO/ROSCOE Cross-Memory and CICS, the appropriate change must be applied before the ICOLOR variable is activated.

## Language support in IOA screens

INCONTROL products are shipped with the default version of IOAX037 (IOA user Exit 37), which is used to translate specific hexadecimal values. The default version of this exit translates certain hexadecimal values to X'40' (blanks). This could result in incorrect display of some screen characters under certain circumstances, in which case this exit may require local tailoring.

For further information on modifying this exit, refer to the description of the IOAX037 Exit in IOA Exits.

## IOA Access Method

Several INCONTROL products include files that are processed using an internal component called the IOA Access Method.

The IOA Access Method is used to create indexed (keyed) file structures that offer enhanced data integrity. IOA Access Method files are physical sets of sequential datasets that are allocated, formatted and accessed by INCONTROL products using IOA Access Method utilities.

Most IOA Access Method files consist of two separate sequential datasets:

- a data component, where the actual record information resides
- an index component, which provides keyed access to records in the data component

Some IOA Access Method files may contain only an index or data component.

The IOA Access Method provides dual mirror image file support. This mechanism enables a quick recovery of IOA Access Method files if a disk crash occurs on a disk that contains IOA Access Method primary files.

## File Structure

IOA Access Method index component records are fixed length. IOA Access Method file data component records can be fixed or variable length. Each record is represented by the relative byte address of the record (RBA), which consists of four bytes. As shown in the table, the first byte represents the extent number of the record; the next two bytes represent the block number within the extent; the last byte represents the record number within the block.

**Table 31 Relative Byte Address Components**

Relative Byte Address Components			
First Byte	Second Byte	Third Byte	Fourth Byte
Extent	Block	Block	Record

Both index file and variable data file information are stored in compressed format, resulting in reduced I/O processing overhead and optimum disk space utilization.

The first block in each IOA Access Method file extent consists of a control record. For data file components with fixed length records, the control record contains an RBA of the first free record in the database; each free record contains an RBA of the next free record. For data file components with variable length records, the control record contains a bit table indicating the blocks within the extent that contain free space for additional records. The IOADIG utility can be used to check the integrity of the list of free records. For details of the IOADIG utility, see the *INCONTROL for z/OS Utilities Guide*.

IOA Access Method index files function as balanced tree index structures.

In addition to index (key) and data record pointer fields, IOA Access Method file index component records can contain non-key data, enabling non-key selection criteria to be used without accessing the associated IOA Access Method file data component. Non-key data fields in index records can be stored in compressed format, providing maximum space utilization benefits.

## Examples of file structure

- Control-D User Report List files are indexed by recipient name, job name and record creation timestamp.
- Control-M/Analyzer Group Definition files are indexed by group name.

Data and index components may extend beyond one physical dataset. Initially, however, a component is allocated as a single physical dataset called the primary extent.

To increase an IOA Access Method file component's capacity, a maximum of 255 secondary extent datasets can be allocated and formatted. Using an IOA Access Method definition option, secondary extent allocation and formatting can automatically be performed when an out-of-space condition occurs.

Secondary extents are supported only in Control-D, Control-V, and Control-M/Tape.

## Deleting Records in IOA Access Method Files

If a record is deleted from an IOA Access Method file, the space previously required for that record is reusable for other records. The block that contained the deleted record is reorganized during the deletion process to consolidate all free space of the block in one piece.

## IOA Access Method Naming Conventions

IOA Access Method files that are allocated during IOA, Control-D, Control-V, Control-M/Analyzer, and Control-M/Tape installation are listed in [Files Supported by the IOA Access Method](#) (on page 73), and use the following naming convention:

---

```
prefix.dbname.Ennn
```

---

where

- prefix is the IOA Access Method file name prefix. The prefix is specified during product installation by setting relevant installation variables (for example, DBPREFB for Control-M/Analyzer, and DBPREFD for Control-D and Control-V).

The prefix can contain more than one qualifier.



- dbname is the IOA Access Method file identifier name. The identifier name is specified during product installation as part of the name assigned by parameter DSN in the IOA Access Method file's definition statements. For example, identifier name ACT is assigned to the Control-D Active User Report list data component while ACTI is assigned to the Control-D Active User Report list index component. The identifier name of an IOA Access Method file is never modified.
- Ennn is the extent sequence number suffix generated internally by IOA Access Method management routines whenever an IOA Access Method file component is allocated. The suffix consists of the letter E followed by nnn, a number from 000 to 255, indicating an IOA Access Method file's extent sequence number. A maximum of 255 additional file extents can be associated with each IOA Access Method file.

## Files Supported by the IOA Access Method

**Table 32 IOA Files**

File	Description
&DBPREFA.PROD.DBSD.E000	IOA Variable Database facility: Definition file data component.
&DBPREFA.PROD.DBSI.E000	IOA Variable Database facility: Definition file index component.
&DBPREFA.PROD.COLD.E000	IOA Variable Database facility: Column file data component.
&DBPREFA.PROD.COLI.E000	IOA Variable Database facility: Column file index component.
&DBPREFA.PROD.VARD.E000	IOA Variable Database facility: Variable file data component.
&DBPREFA.PROD.VARI.E000	IOA Variable Database facility: Variable file index component.
&DBPREFA.PROD.LOGI.E000	IOA Log file index component

**Table 33 Control-D Files**

File	Description
&DBPREFD.HST.E000	History User Report list data component.
&DBPREFD.HSTI.E000	History User Report list index component.
&DBPREFD.ACT.E000	Active User Report list data component.
&DBPREFD.ACTI.E000	Active User Report list index component.

File	Description
&DBPREFD.PRM.E000	Permanent User Report list data component.
&DBPREFD.PRMI.E000	Permanent User Report list index component.
&DBPREFD.GIR.E000	Control-V Global Index data component.
&DBPREFD.GIRI.E000	Control-V Global Index index component.

**Table 34 Control-V Files**

File	Description
&DBPREFD.MIG.E000	Control-V Migrated User Report list data component.
&DBPREFD.MIGI.E000	Control-V Migrated User Report list index component.

**Table 35 Control-M/Analyzer Files**

File	Description
&DBPREFB.GRPD.E000	Group Definition file data component.
&DBPREFB.GRPI.E000	Group Definition file index component.
&DBPREFB.JAFD.E000	Rule Activity file data component.
&DBPREFB.JAFI.E000	Rule Activity file index component.
&DBPREFB.MODD.E000	Basic Parameters file data component.
&DBPREFB.MODI.E000	Basic Parameters file index component.
&DBPREFB.REPD.E000	Report file data component.
&DBPREFB.REPI.E000	Report file index component.
&DBPREFB.VARD.E000	Variables Generation file data component.
&DBPREFB.VARI.E000	Variables Generation file index component.
&DBPREFB.ABF.E000	Active Balancing file data component.
&DBPREFB.ABFBKP.E000	Backup Active Balancing file data component.

**Table 36 Control-M/Tape Files**

File	Description
&DBPREFT.MDBD.E000	Control-M/Tape Media Database data component.
&DBPREFT.MDBI.E000	Control-M/Tape Media Database index component.
&DBPREFT.STKD.E000	Control-M/Tape Stacking Database data component.
&DBPREFT.STKI.E000	Control-M/Tape Stacking Database index component.

Jobs or procedures using IOA Access Method files contain a DD statement only for the first extent of the primary file. All other extents are dynamically allocated when the IOA Access Method file is opened.

## Building Index Utilities

A building index utility is provided for each INCONTROL product that uses IOA Access Method files.

**Table 37 Building Index Utilities for INCONTROL Products**

INCONTROL Product	Building Index Utility
Core IOA	IOADBIB For the IOALOG Index file, use IOALOGI.
Control-D and Control-V	CTDDIB For the Control-V Global Index file, use CTDGBIB.
Control-M/Analyzer	CTBDBIB
Control-M/Tape	CTTBIX for the Media Database, and CTTDBIB for the Stacking Database.

## File Utilities

A comprehensive set of utilities is provided for INCONTROL products that use IOA Access Method files. These utilities are used to create and maintain IOA Access Method files.

**Table 38 Utilities for IOA Access Method Files**

Utility	Description
IOADBF	Allocates and formats an IOA Access Method file's index or data component.
IOADIG	Verifies the integrity of an IOA Access Method file's data component.
IOADII	Verifies the integrity of an IOA Access Method file's index component.
IOADPT	Prints an IOA Access Method file's data and index component records in SNAP dump format.
IOADCPY	Copies an IOA Access Method file from the dual mirror image file to the primary, as well as from the primary file to the dual mirror image file.
IOADLD	Loads an IOA Access Method file's contents from a sequential file.
IOADUL	Unloads an IOA Access Method file's contents to a sequential file.
IOALOGI	Builds IOA Log Index file according to the IOA Log file.
IOALOGXC	Activates and deactivates the IOA Log Index file.

Products that use the IOA Access Method contain additional utilities that are specific to the product. For more details about additional IOA Access Method utilities, see the summary list of utilities in the *INCONTROL for z/OS Utilities Guide*.

## File Definition Statements

When allocating and formatting an IOA Access Method file (that is, using utility IOADBF), a library member containing IOA Access Method File Definition statements is read.

These statements define an IOA Access Method file's physical and logical attributes, such as dataset name, unit, volume parameters, space parameters, record key length (for IOA Access Method file index components), and whether additional file extents are allocated automatically or manually when the current file extent is full. The members reside in the IOA INSTWORK library.

**EXAMPLE:** The IOA Access Method File Definition statement for Control-D's History User Report list components can be found in the DEFHST and DEFHSTI members in the IOA INSTWORK library.

**EXAMPLE:** The IOA Access Method File Definition statement for Control-M/Analyzer's Group Definition components are the DEFGRPD and DEFGRPI members in the IOA INSTWORK library.

The attributes of the IOA Access Method file are kept in the file control block. If you need to change these parameters after the file is created, you can first modify the Definition Statements member and then run the IOADBF utility with FUNC=CHANGE.

BMC highly recommends that you make the modifications to the Definition Statements member using the ICE Customization activity, in order to take advantage of its space calculation and job formatting steps. Using ICE, specify the product code (for example, IOA, CTM) in the Customization screen, select Product Customization, and then select major step 2, "Customize Dataset Parameters." Perform the minor steps in order for each file you want to modify.

For more information on IOA Access Method File Definition statements, see the IOADBF utility in the *INCONTROL for z/OS Utilities Guide*.

## Dual Mirror Image File Support

Each IOA Access Method file can be created with dual mirror image file support. For each logical extent of the file, the IOA Access Method automatically allocates a dual extent of the same size. The name of the dual extent is identical to that of the corresponding primary extent, except for the first character of the last qualifier that is set to D instead of E (for example, prefix.dbname.Dnnn).

The dual mirror image file is not supported by Control-M/Tape.

The dual mirror image file is created if parameter DUAL in the IOA Access Method definition member is set to Y (Yes). (For more information, see the IOADBF utility in the *INCONTROL for z/OS Utilities Guide*.) The definition member also specifies the unit and volume names for the dual file allocation.

The IOA Access Method synchronizes the primary and dual files. All read operations are performed only from the primary file, and all write operations are performed in parallel to both files. The dual file is allocated dynamically.

For improved performance and recovery capability, different volumes must be used for the primary and dual files.

You should activate dual mirror image support for only the data component and not the index component of the IOA Access Method files.

## Dual Mirror Image File Parameters

The following parameters are used to manage the dual mirror image file:

- **DUALM**

If parameter DUALM is set to Y (Yes) and an error occurs in the dual mirror image file, the current operation fails for the primary file as well. Make any manual corrections before any further processing is done. If parameter DUALM is set to N (No), processing continues for the primary file only, without dual mirror image file support.

- DUALST

An additional dual mirror image option is an internal timestamp checkpoint to ensure that the primary and dual copies are fully synchronized. This ensures greater data integrity but increases I/O processing overhead.

This option is activated if parameter DUALST in the IOA Access Method definition member is set to Y (Yes) during file creation. If the timestamp values are not synchronized between the primary and dual files, the dual file is rebuilt. For additional information, see the IOADBF utility in the *INCONTROL for z/OS Utilities Guide*.

## Recovering From a Damaged IOA Access Method File

If the IOA Access Method is used with dual file support and one of the two copies corrupt, the damaged file can be restored by using utility IOADCPY. This utility copies all the extents of the working copy to the corresponding extents of the corrupted copy. For more information, see the IOADCPY utility in the *INCONTROL for z/OS Utilities Guide*.

## IOA Profiles

A profile is a set of values to be used as default values for certain fields in IOA screens during sessions of a specific user or group of users (for example, the library name field in the Job Scheduling Definition entry panel, or a show screen filter).

The IOA Online environment provides the following types of profiles:

- the Global profile, which can only be customized by the system administrator

This profile serves as the default setting for all users in the Online environment. If the user profile does not indicate a setting for a specific field, or does not provide a value for a specific variable, the value specified in the Global profile is used.

The Global Profile also contains screen filter definitions that can be used by any user in addition to the filter definitions defined in the user's User profile.

The Global profile is a combination of the default values in member \$PROFILE and the overriding specifications in member \$PROFMOD, as explained in [Profile Members](#) (on page 79).

- user profiles, which are defined for users or specific groups of users.

These profiles, explained in [Profile Members](#) (on page 79), can include menu definitions and user-defined filters. Settings in the User profile override the settings in the Global profile.

## Profile Members

The table describes the profile members and the global profile information they contain.

**Table 39 Members Containing Global Profile Information**

Member	Description
\$PROFILE	<p>This member, located in the IOAENV library, contains:</p> <p>The default settings for the IOA Online environment. These default settings are not changed.</p> <p>A line that indicates the location of the User Profile members.</p> <p>The values specified for profile variables (runtime parameters). The values of all profile variables are resolved and maintained dynamically (when needed) according to their values in member DEFPARM in the IOA PARM library. For more information about the variables in this member, see <a href="#">Profile Variables</a> (on page 82).</p>
\$PROFMOD	<p>Contains global customization information. This member is located in the IOA PARM library. The member can contain the following types of information.</p> <p>Global filter definitions.</p> <p>User profile locations. If specified, these override the User profile location specified in member \$PROFILE.</p> <p>Values to override the default values for fields specified in member \$PROFILE.</p> <p>This member can be copied so that customization need not be redefined when upgrading from a previous version.</p>

\$PROFFLD and \$PROFVAR combined as \$PROFILE and are found in the IOAENV library.

User profile members are located in libraries specified in member \$PROFILE and, optionally, in \$PROFMOD. These libraries are listed in the lines beginning with a dollar sign (\$) in the \$PROFILE member. For example, the following lines indicate that the user profile for user M89 is in library IOAP.OPRM.PROF and that all other user profiles are in library IOAP.OPR.PROF.

```

000059 *          POINTERS TO USER'S PROFILE LIBRARIES.          *
000060 *-----*
000061 $M89          =IOAP.OPRM.PROF
000062 $*            =IOAP.OPR.PROF
By default, the following line is included in member $PROFILE:
$*              =%OLPREFA%.PROF

```

This line indicates that all user profiles are found in the PROF library with the prefix of the dataset in which IOA was installed.

User profiles can be divided into more than one library. For example,

```
$M*           =%OLPREFA%.PROFM
$N*           =%OLPREFA%.PROFN
```

can be used to direct all User profiles beginning with M to be stored in the PROFM library and User profiles beginning with N to be stored in the PROFN library.

Mask characters (\*) and (?) can be used in the specification of the user names (profiles) to be stored in a specific library.

## Profile Contents

The following types of lines can appear in a profile member:

- lines that contain an asterisk (\*) in column one are remark lines
- lines that contain a dollar sign (\$) in column one indicate user profile libraries
- lines describing either variables, fields or filter fields. These are called Profile Symbol lines

The table describes the format of the Profile Symbol lines.

**Table 40 Profile Symbol Lines Format**

Columns	Description
Columns 1–8	Profile symbol (field) name. Mandatory.
Column 9	Period. (Mandatory only if a Filter name follows.)
Columns 10–17	Filter name. Optional. Default: blank.
Column 18	Equal sign (=). Mandatory.
Columns 19–72	Profile symbol value. Blank is a valid value.

### Examples

The line shown below is a regular field line (not a filter).

```
SRLBLIB      =%OLPREFB%.RULES
```

The following lines describe global filter ENDNOTOK that, when activated, displays all ended NOTOK jobs from the Control-M Active Environment screen (Screen 3):

```
SACT900 .ENDNOTOK=N
SACT704 .ENDNOTOK=N
```



## Considerations for Profile Symbol Lines

- Values for Profile variables are specified in ICE (using the Customization option in the main ICE screen, entering IOA in the Product field, and then selecting Product Customization). The values are stored in member \$PROFILE in the IOAENV library. For details on what values to specify for the Profile variables using ICE, see [Profile Variables](#) (on page 82).
- Field lines contain values to be used for fields in IOA that are not part of a SHOW window (for example, a library name in a rule, job and mission definition entry panel). Field lines can be located in any of the following members:

**Table 41 Members that Can Contain Field Lines**

Member	Description
\$PROFILE	The field line indicates the default value supplied with the IOA installation.
\$PROFMOD	The field line indicates a value specified as part of on-site customization of the Global profile. Field line specifications in \$PROFMOD override specifications in \$PROFILE.
\$userid	The field line indicates a value specified as part of a user profile.

- Filter field lines specify values for selection criteria fields in Show Window filters (For example, Y (Yes) or N (No) for field UTILITIES in the IOA Log Show Screen Filter window indicates whether messages from Control-M/Tape utilities are displayed).

## SHOW Window Filters

A filter is a set of values for fields in a show window. The user can name a set of values and activate a filter at a later time by specifying the following command in the command line of the relevant screen:

---

`SHOW filtername`

---

Filters that are saved by a specific user are stored in that user's User Profile member. To add a filter to the Global profile, perform the following steps:

1. Create and save the filter in your User Profile member.
2. Copy the lines containing the name of the filter from your User Profile member to the Global Profile member (\$PROFMOD).

Some default filters are provided in member \$PROFILE.

Filters are provided for the Active Environment screen (option 5 from the IOA Primary Option menu) and the IOA Log Display (option 5 from the IOA Primary Option menu). For more information about IOA filters, see the descriptions of these options in the relevant INCONTROL product user guides.

## Profile Attribute in the Screen Definition

IOA is installed with default profile attributes assigned to various fields. You can change these defaults as follows:

A field can be defined with a profile attribute by adding parameter PROF=YES to the field macro definition in the screen definition member in the MSGENG library. For example:

```
NAME=SSCHROL , ATTR=UH , LTH=4 , PROF=YES
```

For instructions on how to change the screen format, see [Recommended Steps for Screen Modification](#) (on page 60).

Under certain screens, parameter PROF designates the name of the profile variable. When YES is specified, the field name is used as the Profile Variable name. If you want to change the profile attributes of these screens, contact BMC Customer Support.

IOA profile capability can be applied to fields in the header, footer, and windows of each screen, but not to fields that are part of a scrollable area on the screen. If you want to apply the profile capability to a field in a scrollable area, contact BMC Customer Support.

## Saving a Profile

A profile is saved by writing it to the user profile library in a member whose name is identical to the user ID (the Online environment session ID, for example, TSO user ID). However, a profile is saved only when the user exits the IOA Online facility, and only in case of normal termination.

If the profile library is full, the attempt to save a User profile fails with a D37 abend. It is recommended that the profile library be compressed regularly.

## Profile Variables

Follow the major and minor steps in ICE to specify values for the Profile variables. If you are not familiar with the ICE application, see the *INCONTROL for z/OS Installation Guide: Installing*.

To change the value of a Profile variable, perform the following steps in ICE:

1. Select **Customization**.
2. Enter **IOA** in the **Product** field.
3. Select **Product Customization**.
4. Select major step 3, "Profile Variables."
5. Select the type of variable.
6. Locate the desired variable and specify the required value.

Online help is available for each variable specified using ICE. The following sections describe each variable.

7. Save the values you entered by selecting "Step 6.7 Save Values in \$PROFMOD."

ICE allows referencing of previous settings of Profile variables specified in other (previous or current) environments of IOA. When installing a new IOA environment, it is possible to automatically retrieve the predefined settings at your site. A default value is provided for any new profile variables that are not retrieved.

To retain predefined settings (for example, from previous INCONTROL versions), copy the version of member \$PROFMOD from your previous version to the PARM library after completing the ICE installation.

## Window Display Variables

**Table 42 Window Display Variables**

Variable	Description
SABKWND	<p>Controls whether to display the Save confirmation window when a request is made to update a backup mission from the Control-D Active Mission Zoom screen (Screen A.Z).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – The confirmation window is displayed.</li> <li>▪ N (No) – The backup mission is updated without prompting the user for confirmation. Default.</li> </ul>
SACT3NFL	<p>Controls whether Screen 3.N is affected by the Show filter in use in Screen 3. (Screen 3.N is displayed when the N command is entered in Screen 3.)</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – The Show filter in use in Screen 3 governs what is displayed in Screen 3.N. Default.</li> <li>▪ N (No) – Screen 3.N is unaffected by the Show filter in use in Screen 3, and includes all jobs linked with the job selected.</li> </ul>
SACTCNF	<p>Controls whether a confirmation window is opened when a request is made to rerun a job in the Active Jobs file (Screen 3) with the status WAIT CONFIRMATION (Control-M without Control-M/Restart).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – A confirmation window is displayed. Default.</li> <li>▪ N (No) – An attempt is made to rerun the job without prompting the user for confirmation.</li> </ul>
SACTDEL	<p>Controls whether a confirmation window is opened when a request is made to delete an entry from the Control-M Active Environment screen (Screen 3).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – A confirmation window is displayed.</li> <li>▪ N (No) – The delete request is processed without prompting the user for confirmation. Default.</li> </ul>
SACTFCB	<p>Defines the default value that will appear in the CTB STEP statements field in the FORCE OK confirmation window. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes). Default.</li> <li>▪ N (No)</li> </ul>

Variable	Description
SACTFOK	<p>Controls whether a confirmation window is displayed when the O (Force OK) option is specified in the Control-M Active Environment screen (Screen 3). Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – A confirmation window is displayed.</li> <li>▪ N (No) – The delete request is processed without prompting the user for confirmation. Default.</li> </ul>
SACTFOU	<p>Defines the default value that will appear in the OUT statements field in the FORCE OK confirmation window. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes). Default.</li> <li>▪ N (No).</li> </ul>
SACTFPS	<p>Defines the default value that will appear in the ON PGMSTEP statements field in the FORCE OK confirmation window. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes)</li> <li>▪ N (No)</li> </ul> <p>If no value is specified, the value set in the FRCOKOPT parameter will be the default value for that field.</p>
SACTFSH	<p>Defines the default value that will appear in the SHOUT statements field in the FORCE OK confirmation window. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes). Default.</li> <li>▪ N (No)</li> </ul>
SACTLGO	<p>Determines which IOA Log messages are displayed when L is typed next to a job on the Control-M Screen 3.</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – only log messages that match the orderid of the specified job. Default.</li> <li>▪ N (No) – all log messages for the specified job</li> </ul>
SACTMSK	<p>Specifies how to treat character search criteria in versions prior to 6.2.xx, which do not use masking characters.</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – Treat all character search criteria as if a masking character was entered. For example, if AB was entered as a member name to be searched, the SACTMSK variable causes that entry to be treated as AB*. Default.</li> <li>▪ N (No) – Do not add a masking character.</li> </ul>

Variable	Description
SACTRER	<p>Controls whether a confirmation window is opened when a request is made to rerun a job (Control-M without Control-M/Restart).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – A confirmation window is displayed. Default.</li> <li>▪ N (No) – An attempt is made to rerun the job without prompting the user for confirmation.</li> </ul>
SAMAWND	<p>Controls whether a confirmation window is displayed when a request is made to rerun a mission from the Control-D Active Missions screen (screen A).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – A confirmation window is displayed. Default.</li> <li>▪ N (No) – The request to rerun a mission is processed without prompting the user for confirmation.</li> </ul>
SAMDEL1	<p>Controls whether a confirmation window is opened when a request is made to delete an entry from the Control-D Active Missions screen (Screen A).</p> <p>A confirmation window is displayed.</p> <p>The request to delete an entry from the Active Missions screen is processed without prompting the user for confirmation. Default.</p>
SAPRWND	<p>Controls whether to display the Save confirmation window when a request is made to update a printing mission from the Control-D Active Mission Zoom screen (Screen A.Z).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – The confirmation window is displayed.</li> <li>▪ N (No) – The printing mission is updated without prompting the user for confirmation. Default.</li> </ul>
SARSWND	<p>Controls whether to display the Save confirmation window when a request is made to update a restore mission from the Control-D Active Mission zoom screen (screen A.Z).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – The confirmation window is displayed.</li> <li>▪ N (No) – The restore mission is updated without prompting the user for confirmation. Default.</li> </ul>
SDECWND	<p>Controls whether to display the Save confirmation window when a request is made to update a decollation mission from the Control-D Active Missions zoom screen (screen A.Z).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - The confirmation window is displayed.</li> <li>▪ N (No) - The decollation mission is updated without prompting the user for confirmation. Default.</li> </ul>

Variable	Description
SDWYCNA	<p>Controls whether to display the Save confirmation window when a request is made to update a decollation mission from the Control-D Active Missions zoom screen (Screen A.Z).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - The confirmation window is displayed.</li> <li>▪ N (No) - The decollation mission is updated without prompting the user for confirmation. Default.</li> </ul>
SDWYWND	<p>Controls whether a confirmation window is displayed when a request is made to add a prerequisite condition using the Control-D Why screen (Screen A.?).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - A confirmation window is displayed.</li> <li>▪ N (No) - The add request is processed without prompting the user for confirmation. Default.</li> </ul>
SMSCWND	<p>Controls whether the Reset confirmation window is displayed in the Control-O Message Statistics screen (Screen OM).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - The confirmation window is displayed. Default.</li> <li>▪ N (No) - The Reset is processed without prompting the user for confirmation.</li> </ul>
SNRSCNE	<p>Controls whether a confirmation window is displayed when a request is made to erase a condition from the IOA Manual Conditions list (Screen 7).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - A confirmation window is displayed.</li> <li>▪ N (No) - The erase request is processed without prompting the user for confirmation. Default.</li> </ul>
SRESCND	<p>Controls whether a confirmation window is displayed when a request is made to delete a condition or resource using the IOA Conditions/Resources screen (screen 4).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - A confirmation window is displayed.</li> <li>▪ N (No) - The delete request is processed without prompting the user for confirmation. Default.</li> </ul>

Variable	Description
SSCHCDJ	<p>Controls whether a confirmation window is displayed when a request is made to delete a job in screen 2.</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - A confirmation window is displayed. In this confirmation panel, it is also possible to invoke the Control-M Condition Inheritance feature.</li> <li>▪ N (No) - The delete request is processed without prompting the user for confirmation. Default.</li> </ul>
SSCHDAV	<p>Controls the value of the AUTO-SAVE DOCUMENTATION parameter in the entry panel of the Control-M Scheduling Facility.</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – AUTO-SAVE DOCUMENTATION is set to Y. Changes made to documentation are automatically saved when updating the job scheduling definition.</li> <li>▪ N (No) – AUTO-SAVE DOCUMENTATION is set to N. No changes made to documentation are automatically saved. Default.</li> </ul>
SSCHSJD	<p>Controls the value of the SHOW JOB DOCUMENTATION parameter in the entry panel of the Control-M Scheduling Facility.</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – SHOW JOB DOCUMENTATION is set to Y. Job documentation lines appear when the Job Scheduling Definition screen is displayed.</li> <li>▪ N (No) – SHOW JOB DOCUMENTATION is set to N. No job documentation lines appear. Default.</li> </ul>
SSZMWND	<p>Controls the method of exiting the Control-M Zoom screen (Screen 3.Z) when the user has made changes.</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) -- The PF03/PF15 key (END command) is interpreted as a SAVE request and a SAVE confirmation window is displayed to prompt the user for confirmation. If SAVE is specified in the command line, changes to the job entry are made without displaying the SAVE confirmation window.</li> <li>▪ N (No) -- SAVE must be specified in the command line to request that changes be kept. No SAVE confirmation window is displayed. Default.</li> </ul>

Variable	Description
SUSRDELW	<p>Controls whether a confirmation window is displayed when a request is made to delete a report in the User Report List screen (screen U) of Control-D.</p> <p>If SAVE is specified in the command line, changes to the job entry are made without displaying the SAVE confirmation window.</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - A confirmation window is displayed.</li> <li>▪ N (No) - SAVE must be specified in the command line to request that changes be kept. No SAVE confirmation window is displayed. Default.</li> </ul>
SUSRUPDW	<p>Controls whether a confirmation window is displayed when a request is made to update a report in the User Report List screen (screen U) of Control-D.</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - A confirmation window is displayed.</li> <li>▪ N (No) - The update request is processed without prompting the user for confirmation. Default.</li> </ul>
SWHYCNA	<p>Controls whether a confirmation window is displayed when a request is made to add a prerequisite condition using the Control-M Why screen (Screen 3.?).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - A confirmation window is displayed. Default.</li> <li>▪ N (No) - The add request is processed without prompting the user for confirmation.</li> </ul>
SWHYCND	<p>Determines the condition display mode that will be used upon entry to the Control-M Why screen.</p> <ul style="list-style-type: none"> <li>▪ M (Missing) – The Missing Conditions display mode will be used upon entry to the Why screen. Default.</li> <li>▪ A (All) – The All Conditions display mode will be used upon entry to the Why screen.</li> </ul>



## Color Variables

A color and highlight value can be specified for each of the profile variables described in this section. Each profile variable has its own default color and highlight value. The format for specification of color and highlight is

---

*profile-variable=color,highlight*

---

where

- *profile-variable* is the name of the profile variable for which color and highlight values are being specified. Profile variables used to specify color for elements in the IOA environment are listed below.
- *color* is the color of the relevant element. Valid values are BLUE, RED, PINK, GREEN, TURQ, YELLOW and WHITE.
- *highlight* is the type of display for the element. Valid values are BLINK, USCORE and REVERSE.

The table describes the profile variables that are used to determine the color and highlight attributes of specific elements in the IOA environment.

**Table 43      Profile Variables for Color and Highlights**

Variable	Description
SLNFPAG	Attribute for the sample lines when editing a report to create a ruler in the Control-D Online Viewing screen (screen U.E). Default: RED,REVERSE.
SMSGERR	Attribute for ERROR messages (whose codes end with E). Default: PINK,REVERSE.
SMSGINF	Attribute for INFORMATION messages (whose codes end with I). Default: TURQ,REVERSE.
SMSGSVR	Attribute for SEVERE error messages (whose codes end with S). Default: RED,REVERSE.
SMSGWRN	Attribute for WARNING messages (whose codes end with W). Default: YELLOW,REVERSE.
SNTPCBR	Attribute for the Notepad Window in screen U when a note is being browsed. Default: BLUE.
SNTPCED	Attribute for the Notepad Window in screen U when a note is being edited or created. Default: YELLOW.

On color terminals, the lines of the record-level index value are displayed in the color specified in the first parameter.

On monochrome terminals, the record level index lines are highlighted (in either REVERSE, BLINK or USCORE) as specified in the second parameter.

**Table 44 Highlight on Monochrome Terminals**

Variable	Description
SOLVHFC	Attribute for the header area in Online Viewing screens (screens U.V and 3.V). Default: PINK,REVERSE.
SOLVICL	Attribute for lines containing record level index values when viewing a Control-V report using the U.S.X screen. Default: GREEN,REVERSE.
SOLVLVC	Controls report display using a record level index. <ul style="list-style-type: none"> <li>▪ Y (Yes) - When viewing a report using a record level index, the first line containing the record level index value is displayed at the top of the screen.</li> <li>▪ N (No) - The report is viewed from the beginning of the first page that contains the record level index values. Default.</li> </ul>
SOLVOCL	Attribute for the overlay line in Online Viewing screens (screens U.V and 3.V). Default: RED,REVERSE.
SOLVSCL	Attribute for the scrollable area in Online Viewing screens (screens U.V and 3.V). Default: BLUE,REVERSE.
SSYVSCL	Attribute for the Sysout viewed from screens U.V and 3.V. This parameter is effective only for sites with Control-M/Restart installed. Default: WHITE, REVERSE.

## Work Mode Variables

**Table 45 Work Mode Variables**

Variable	Description
DFJCONF	<p>Controls whether a confirmation panel is displayed when the JOB parameter in a DO FORCEJOB request on screen 2 or 2.G is blank.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - The confirmation panel is displayed.</li> <li>▪ N (No) - The confirmation panel is not. Default.</li> </ul>
EXIT8PRM	<p>Determines whether the user can add additional job details to pass to CTMX008, when the exit is called with the X line command in screen 3.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - A window is opened for the user to specify additional information to pass to CTMX008.</li> <li>▪ N (No) - Only the exit is called, no window is opened, no info is passed to CTMX008. Default.</li> </ul>
SACTIFL	<p>Specifies the name of an optional initial filter when entering the Control-M Job Active Environment screen (Screen 3). If a valid filter name is specified, it becomes the default of the initial SHOW filter of Screen 3.</p> <ul style="list-style-type: none"> <li>▪ EXEC Filter - EXEC is displayed as the initial SHOW filter, until the user changes it using the SHOW xxx command, regardless of the last filter that was used.</li> <li>▪ blank - No initial filter is used. The filter that was used the last time screen 3 was entered is displayed. Otherwise, the default filter is used as the initial filter. Default.</li> </ul>
PDATELTH	<p>Date format length (does not affect all IOA date references).</p> <p>Note: This variable affects only MDY and DMY date formats.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>▪ 6 digits - The format is ddmmyy. Default.</li> <li>▪ 8 digits -- The format is ddmmyyyy.</li> </ul>

Variable	Description
PGRPEMPT	<p>Permits the user to save SMART Tables that contain only a SMART Table Entity (with no job definitions) via screen 2. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – Empty SMART Tables with no job definitions can be saved.</li> <li>▪ N (No) – Only SMART Tables with job definitions can be saved. Default.</li> </ul>
PNRSDTYP	<p>Defines the default value of the date field in the window opened as a result of adding a new manual condition (ADD NEW command) in the IOA Manual Conditions file (screen 7). Valid values are:</p> <ul style="list-style-type: none"> <li>▪ DATE - The current MVS system date is inserted in the window. Default.</li> <li>▪ ODAT - The ODAT (the original scheduling date) is inserted in the window.</li> </ul>
PSCHDTYP	<p>Defines the default value of the date field in the confirmation window opened as a result of ordering or forcing a job, rule or mission from a Definition List screen (screens 2, R, M, OR, TR, and BM). Valid values are:</p> <ul style="list-style-type: none"> <li>▪ DATE - Current system date is inserted in the window. Default.</li> <li>▪ ODAT - The original scheduling date is inserted in the window.</li> </ul>
PZUMFAPP	<p>Controls whether the user is required to enter a value in the APPLICATION field in the Job Scheduling Definition screen (screen 2).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - The user is required to enter a value in the APPLICATION field.</li> <li>▪ N (No) - The user is not required to enter a value in the APPLICATION field. Default.</li> </ul>
PZUMFGRP	<p>Controls whether the user is required to enter a value in the GROUP field in the Job Scheduling Definition screen (screen 2).</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - The user is required to enter a value in the GROUP field.</li> <li>▪ N (No) - The user is not required to enter a value in the GROUP field. Default.</li> </ul>

Variable	Description
RESWPF3	<p>Specifies whether the PF03/PF15 key is used in addition to the PF04/PF16 key in the Show window and the Control-M/Restart Step List window of the Active Environment screen (Screen 3) to reset (that is, exit the window with no action). Valid values:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - The PF03/PF15 key resets the window.</li> <li>▪ N (No) - The PF03/PF15 key does not reset the window. Default.</li> </ul>
SINSLMT	<p>Limits the lines to be read in the Control-M/Tape Media Database list (screen TI).</p> <p>The search limit is a number from 1 to 999,999. Default: 100,000.</p>
SNRSDRNG	<p>Determines the DATE range for the IOA Manual Conditions file (screen 7). Valid values are:</p> <ul style="list-style-type: none"> <li>▪ ALL</li> <li>▪ YEAR</li> <li>▪ MONTH</li> <li>▪ -nnn - Sets FROM to -nnn days from today and UNTIL to the current date. Default: -3</li> </ul>
SRCHLMT	<p>Specifies the search limit for the IOA Log file and the Automation Log file (screens 5 and OL). Default: 010000.</p>
	<p>Note: A value of 999999 specifies an unlimited search. Two pop-up windows will be displayed (for SRCHLMT and SROLFDL) when both variables do not specify an unlimited search.</p>
SRESDRNG	<p>Determines date range for the IOA Conditions or Resources screen (screen 4). Valid values are:</p> <ul style="list-style-type: none"> <li>▪ ALL</li> <li>▪ YEAR</li> <li>▪ MONTH</li> <li>▪ -nnn - Sets FROM to -nnn days from today and UNTIL to the current date. Default: -3</li> </ul>
SROLFDL	<p>Limits the number of lines searched using the FIND command in the IOA Online facility screens and in the Control-D User Reports facility. This parameter must contain five valid digits (including leading zeroes if necessary). Default: 05000 (that is, 5000 lines).</p>
	<p>Note: A value of 99999 specifies an unlimited search. Two pop-up windows will be displayed (for SRCHLMT and SROLFDL) when both variables do not specify an unlimited search.</p>

Variable	Description
SSCHBRO	<p>Controls whether a user is forced into BROWSE mode when a job, mission or rule definition selected from an IOA definition screen is in use by another user. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - Force the user into BROWSE mode.</li> <li>▪ N (No) - Display message IOAE32E and reject the option. Default.</li> </ul>
SSYVORD	<p>Controls the order of jobs displayed in screen 3.V of the Control-M/R Online interface (SYSOUT Viewing screen). This parameter is relevant only for sites with Control-M/Restart installed. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ FIFO - Sysouts are displayed in FIFO (first in, first out) order. The oldest job's Sysout is displayed first. Default.</li> <li>▪ LIFO - Sysouts are displayed in LIFO (last in, first out) order. The most recent job's Sysout is displayed first.</li> </ul>
SUS2LMT	<p>Limits the lines to be read in screen U.</p> <p>The search limit is a number from 1 to 999,999. Default: 500.</p> <p>A value of 999999 specifies an unlimited search.</p>
SUS2SRTI	<p>Controls whether to activate the SORT command in screen U. (Control-D or Control-V User Report List).</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - Automatically activate the SORT command upon accessing screen U.</li> <li>▪ N (No) - The SORT command is not activated when accessing screen U. Default.</li> </ul> <p>For details about the SORT command in screen U, see the online facilities chapter in the <i>Control-D and Control V User Guide</i>.</p>
SUS2STOR	<p>Controls whether to show reports created by a printing mission with parameter STORE set to YES.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes)—Both stored and non-stored reports are displayed in the Active User Report List screen. Default for the command.</li> <li>▪ O (Only)—Only stored reports are displayed in the Active User Report List screen.</li> <li>▪ N (No)—Stored reports are not displayed in the Active User Report List screen.</li> </ul>

Variable	Description
SUS2TRE	<p>Controls whether to check if a user name exists in the Control-D Recipient Tree when using the GIVETO command and when adding an additional user using the ADD INFO option in the Control-D and Control-V User Report List screen.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - Check if the user name exists in the Control-D Recipient Tree.</li> <li>▪ N (No) - Do not check if the user name exists in the Recipient Tree.</li> </ul>
SVEWFFI	<p>Controls whether to use a fast find algorithm when using the FIND command in Control-D and Control-V screen U.V and Control-M screen 3.V. Valid values:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - Activate a fast find algorithm that requires up to 50% less CPU time when searching forward. Supports only all uppercase and all lowercase search strings. Mixed case strings are not supported.</li> <li>▪ N (No) - The regular FIND command is activated when viewing reports or sysouts. Supports uppercase, lowercase and mixed case search strings. Default.</li> </ul> <p>The line where the string is found is always displayed as the first line on the screen. In Control-D and Control-V, the fast find algorithm is used only when viewing reports without rulers.</p>
SZUMLCM	<p>Controls whether Control-M Online users will be able to enter lowercase data in the text lines of DO MAIL statements.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - allow lower case data in DO MAIL statements</li> <li>▪ N (No) - translate lower case data in DO MAIL statements to upper case. Default</li> </ul>

## Presentation Mode Variables

**Table 46 Presentation Mode Variables**

Variable	Description
ISPFBOTL	Controls the position of the last screen line when the IOA Online interface operates under ISPF. Valid values are:  L1 - The last IOA screen line is displayed on the bottom line of the physical screen. Default.  L2 - The last IOA screen line is displayed on the second line from the bottom of the physical screen.
SACTBYP	Controls whether the Status field of jobs in the Control-M Active Environment screen (Screen 3) contains a detailed list of all Bypass options specified for the job. Valid values are:  Y (Yes) - Show all the Bypass options of the job.  N (No) - Do not show all the Bypass options of the job.
SACTMOD	Controls the starting point and direction of data flow in the Control-M Active Environment screen (Screen 3). Valid values are:  BOT - On entering the Active Environment screen, jobs at the bottom of the Active Jobs file (that is, the newest jobs) are displayed. The user can use scrolling commands and PFKeys to scroll upward (to the oldest jobs). Default.  TOP -- On entering the Active Environment screen, jobs at the top of the Active Jobs file (that is, the oldest jobs) are displayed. The user can use scrolling commands and PFKeys to scroll downward (to the newest jobs).
SBALTBO	Controls whether a single or double confirmation window is opened when a mission is ordered or forced in the Control-M/Analyzer Mission List screen (Screen BM). Valid values are:  Y (Yes) - A single double confirmation window is opened when a mission is ordered or forced.  N (No) - A confirmation window is opened when a mission is ordered or forced. Default.
SMISTBO	Controls whether a single or double confirmation window is opened when a mission is ordered or forced in the Control-D Printing, Backup or Restore Mission list (Screen M).  Y (Yes) - A double confirmation window is opened when a mission is ordered or forced.  N (No) - A single confirmation window is opened when a mission is ordered or forced. Default.



Variable	Description
SMNUBLM	<p>Controls how the IOA Primary Option menu is displayed.</p> <p>B - Always display the menu in box style.</p> <p>Lxxxxxx - Display the menu in box style when the number of lines of the menu equal or exceed the number specified by xxxxxx. Default.</p> <p>Txxxxxx - Display the menu in box style when the number of boxes of the menu equal or exceed the number specified by xxxxxx.</p>
SOMPTBO	<p>Controls whether a confirmation window or a double confirmation window is opened when an entire table is ordered or forced in the Control-O Rule Table list (Screen OR).</p> <p>Y (Yes) - A double confirmation window is opened when a table is ordered or forced.</p> <p>N (No) - A confirmation window is opened when a table is ordered or forced. Default.</p>
SRCMTBO	<p>Controls whether a single or double confirmation window is opened when a rule is ordered or forced in the CMEM Rule list (Screen C).</p> <p>Y (Yes) - A double confirmation window is opened when a mission is ordered or forced.</p> <p>N (No) - A single confirmation window is opened when a mission is ordered or forced. Default.</p>
SREPTBO	<p>Controls whether a single or double confirmation window is opened when a mission is ordered or forced in the Control-D Mission list (Screen R).</p> <p>Y (Yes) - A double confirmation window is opened when a job is ordered or forced.</p> <p>N (No) - A single confirmation window is opened when a job is ordered or forced. Default.</p>
SRLDATO	<p>Controls whether Rule Description or Rule Data is displayed by default in the Control-M/Tape Rule list (Screen TR).</p> <p>Y (Yes) - Display the Rule Description by default.</p> <p>N (No) - Display the Rule Data by default.</p>

Variable	Description
SSCHTBO	<p>Controls whether a single or double confirmation window is opened when a table is ordered or forced in the Control-M Table list (Screen 2).</p> <p>Y (Yes) - A double confirmation window is opened when a table is ordered or forced.</p> <p>N (No) - A single confirmation window is opened when a table is ordered or forced. Default.</p>
SUSRFTR	<p>Controls the default display type of the footer of the User Report entry panel. Default: blank. When a blank is encountered, the following values are used:</p> <p>Display type D: When only Control-D is installed.</p> <p>Display type V: When Control-V is installed.</p>
SUSRHDR	<p>Controls the default display type of the header of the User Report entry panel. Default: blank. When a blank is encountered, the following values are used:</p> <p>Display type D: When only Control-D is installed.</p> <p>Display type V: When Control-V is installed.</p>
SUSRVIEW	<p>Controls whether the view indicator in the Control-D or Control-V Report List screen (Screen U) is displayed, and if it is displayed, what the format is.</p> <p>Y (Yes) - The view indicator is blank if the report has not yet been viewed and V if the report has been viewed.</p> <p>N (No) - The view indicator is not displayed and not saved.</p> <p>A - The view indicator indicates the number of times (maximum: 255) the report has been viewed. If the number is too large to fit into the display field, an asterisk (*) is displayed. Default.</p> <p>By default, the view indicator is one column wide.</p>
<p>The following variables correspond to the primary line commands in the Control-M Active Environment screen, which can be used to toggle the display of information in the Status portion for each job. These commands are: CPUID, DESC, GROUP, NOTE, ORDERID, and TABLE, and are described in the section describing Active Environment Screen commands in the <i>Control-M for z/OS User Guide</i>:</p>	
SACTCPU	<p>Corresponds to the CPU command to show or hide a job's CPU ID. Valid values are:</p> <p>Y – Show</p> <p>N – Hide (default)</p>

Variable	Description
SACTDSC	Corresponds to the DESC command to show or hide a job's description. Valid values are: Y – Show N – Hide (default)
SACTGRP	Corresponds to the GROUP command to show or hide the SMART Table to which the job belongs. Valid values are: Y – Show N – Hide (default)
SACTNOT	Corresponds to the NOTE command to show or hide any notes attached to the job. Valid values are: Y – Show N – Hide (default)
SACTORD	Corresponds to the ORDERID command to show or hide the job's order ID. Valid values are: Y – Show N – Hide (default)
SACTTAB	Corresponds to the TABLE command to show or hide the name of the job scheduling library and the table from which the job was ordered. Valid values are: Y – Show N – Hide (default)

## Miscellaneous Variables

**Table 47**      **Miscellaneous Variables**

Variable	Description
EDIMACNM	<p>Name of the optional ISPF EDIT IMACRO to be used when editing a job's JCL in Control-M Screens 2.J and 3.J.</p> <p>macro name - The specified IMACRO is invoked at entry to ISPF EDIT.</p> <p>blank - No IMACRO is invoked at entry to ISPF EDIT. Default.</p>
ICOLOR	<p>Specifies whether extended color support is used for terminals accessing the IOA Online facility from IMS, IDMS, and other systems that do not allow determination of terminal characteristics.</p> <p>Y (Yes) - Use extended color support for this terminal.</p> <p>N (No) - Do not use extended color support for this terminal. Default.</p>
IDBCS	<p>Specifies whether Double Byte Character Set support is used for terminals accessing the IOA Online facility from IMS, IDMS, and other systems that do not allow determination of terminal characteristics.</p> <p>Y (Yes) - Use Double Byte Character Set support for this terminal.</p> <p>N (No) - Do not use Double Byte Character Set support for this terminal. Default.</p>
IOAUDLR	<p>Specifies the user-defined dollar-sign character representation. Default \$.</p>
SACTNHB	<p>Controls whether a user is forced into BROWSE mode when a job selected from the Control-M Active Environment screen is not held.</p> <p>Y (Yes) - Force the user into BROWSE mode.</p> <p>N (No) - Do not force the user into BROWSE mode. Default.</p>
SACTRVF	<p>Sets the default value of the View Jobs in Flow field in the Rerun Confirm Window.</p> <p>Y (Yes) - The default value of the View Jobs in Flow field should be Y.</p> <p>N (No) - The default value of the View Jobs in Flow field should be N. Default.</p>

Variable	Description
TCOLOR	<p>Specifies whether extended color support is used for terminals accessing the IOA Online facility from TSO or ROSCOE.</p> <p>Query the hardware to determine whether to use extended color support for this terminal. Default.</p> <p>Y (Yes) - Use extended color support for this terminal.</p> <p>N (No) - Do not use extended color support for this terminal.</p>
TDBCS	<p>Specifies whether Double Byte Character Set support is used for terminals accessing the IOA Online facility from TSO or ROSCOE.</p>
TERMINAL	<p>Query the hardware to determine whether to use Double Byte Character Set support for this terminal. Default.</p> <p>Y (Yes) - Use Double Byte Character Set support for this terminal.</p> <p>N (No) - Do not use Double Byte Character Set support for this terminal.</p>
TRACETIM	<p>Specifies whether or not to produce a SNAP dump when the IOA Online monitor terminates due to a timeout.</p> <p>Y (Yes) - Produce a SNAP dump</p> <p>N (No) - Do not produce a SNAP dump. Default.</p>
USCORE	<p>Controls whether or the UNDERSCORE attribute for terminal fields are suppressed or honored. Some terminals and terminal emulator programs display underscored fields with incorrect colors and/or reverse video.</p> <p>Y (Yes) - Honor the UNDERSCORE attribute.</p> <p>N (No) - Suppress the UNDERSCORE attribute. Default.</p>

## Modifying INCONTROL Product Defaults

After one or more INCONTROL products are installed and running, certain defaults can be modified within the product. For example, you can increase the number of Control-M attempts to read a job's sysout.

To modify INCONTROL product defaults, it is recommended that you perform the process by means of ICE:

1. Enter the main ICE screen.
2. Select Customization.
3. Enter IOA in the Product field.
4. Select Product Customization.
5. Select major step 5, "Customize IOA Defaults."

Then, do the following:

6. Review documentation member IOADFLTS that lists the defaults that can be modified. This member resides in the IOA DOC library.
7. Copy the appropriate lines from member IOADFLT (in source format) in the IOAENV library to the localized version of this member, called IOADFLTL in the IOA PARM library. Make the necessary modifications in member IOADFLTL, leaving member IOADFLT intact. This is detailed in documentation member IOADFLTS.

Because only differences are contained in member IOADFLTL, it is easy to track which changes have been implemented.

In addition to member IOADFLTL in the PARM library, there may be user exits in the IOA SAMPEXIT library that can be applied to modify default processing within a specific product.

Changes take effect "immediately" (that is, when the relevant product's monitor is restarted).

## Modifying IOA Messages

IOA messages can be adapted for local languages, site-specific terminology, and so on.

IOA messages are stored in the IOA MSGnnn library, where nnn is a three-character language identifier (for example, ENG for English, GER for German). According to this naming convention, at English speaking sites the library is the IOA MSGENG library.

Throughout this guide, the English version of this library, IOAENG, is referenced. Substitute the appropriate library name where applicable if English is not the language at your site.

The messages are organized in members with the following naming convention:

---

XXXXXXN

---

where

- XXXXX is the five-character message code prefix. All messages in this member begins with these characters.
- N is the single character indicating the language of the screen (for example, E for English, G for German).

Each member contains definitions for one or more messages. Each message is defined by the following structure:

**Table 48**      **Structure of Messages**

Item	Description
MSGCODE	Code of the message. Do not change this code because it connects the message to the application program.
<message>	Text of the message.
PARM	<p>Position of the text inserted into the message by the IOA application. Optional. The format of this parameter is:</p> <p>PARM=(pos1,pos2,...)</p> <p>where each pos parameter is the position of the inserted text in the message.</p> <p>Parameter PARM is optional, but must be used whenever it already exists in the message definition. When the contents of a message are modified, the position of the application generated area in the message may change, so the PARM field must be modified accordingly. The order of the fields in the PARM is not changed, but it is possible to change the order of appearance in the message by changing the positions.</p>
SCROLL	Indication of how the message scrolls. Default=ASIS. For future use.

**Example**

The following is the original message (from member IOAD8E):

```
MSGCODE=IOAD82E; SCROLL=ASIS
PARM=( 24,38,53 )
ALLOCATION FAILED, RC=xx  ERRORCODE=xxxx  INFOCODE=xxxx
```

The following is the modified message:

```
MSGCODE=IOAD82E; SCROLL=ASIS
PARM=( 24,37,53 )
ALLOCATION FAILED, RC=xx  ERRORCODE=xxxx  INFOCODE=xxxx
```

## Redirecting IOA messages

Messages can be redirected by using the MSGROUT member, residing in the IOA PARM library. MSGROUT is provided as an empty member. A sample is shown below:

```

MSGCODE=msg-prefix,ROUT=(OUT),DDN=PPP
MSGCODE=XMM79,ROUT=(OUT),DDN=PPP
MSGCODE=IOAD97,ROUT=(LOG)
MSGCODE=IOAD91E,ROUT=(WTO),ROUTCDE=(1,2,3),DESC=(1,2,8)
MSGCODE=IOAD9,ROUTCDE=(1,2,3),DESC=(1,2,8)
MSGCODE=IOAD,ROUT=(LOG)

```

The MSGROUT parameters are described in the following table.

The values given to the ROUT, ROUTCDE, and DESC parameters must be enclosed in parentheses.

MSGROUT is provided with sample lines. Each line that starts with an asterisk (\*) is specified as a comment line. Remember to remove the asterisks from the appropriate lines before saving the edited MSGROUT member.

Note: When an IOA message is redirected, some of the fields, which appear in the IOA log, are suppressed in the message as it appears in the WTO, WTOR, and OUT destinations.

**Table 49 MSGROUT Parameters**

Parameter	Description
MSGCODE	Up to 7 characters in length. If it is less than 7 characters, MSGCODE is treated as a generic code. For example, all messages beginning with XMM79 are routed to OUT.
ROUT	May contain up to 3 ROUT codes. Note that this ROUT parameter overrides the ROUT parameter that is hard-coded in the application. Valid values are: <ul style="list-style-type: none"> <li>▪ WTO</li> <li>▪ WTOR - WTOR will be ignored if it has not been hard-coded in the application.</li> <li>▪ OUT</li> <li>▪ LOG</li> <li>▪ NONE - Use ROUT=NONE to suppress a message</li> </ul>
DDN	This is the DDNAME when ROUT=(OUT), or when the ROUT parameter that has been hard-coded in the application is OUT. Default: SYSPRINT
ROUTCDE	Up to 3 route codes can be specified. Valid values for ROUTCDE are in the range from 1 to 128. ROUTCDE is used when ROUT=(WTO) or ROUT=(WTOR).
DESC	Up to 3 descriptor codes can be specified. Valid values for DESC are in the range from 1 to 16. DESC is used when ROUT=(WTO) or ROUT=(WTOR).



## Message Destination Tables

The IOA Shout facility enables the user to specify messages to be sent to specified destinations upon the occurrence of various events.

Destinations in a production environment are not necessarily fixed. For example, the TSO logon ID of the shift manager may be different for every shift. The Dynamic Destination table allows the user to specify a logical destination name for a group of destinations. When the logical destination name is specified as the destination of a Shouted message, the message is sent to each destination in the group.

The following types of destination tables are provided:

- Dynamic Destination Table
- Mail Destination Table
- SNMP Destination Table

### The Dynamic Destination Table

After completing installation, but before using the IOA Shout facility services, you must build and define the parameters in the IOADEST sample member in the IOA PARM library.

If you do not define the global parameters in the IOADEST member, the IOA Shout facility will not function.

The destination parameters, contained in the IOADEST member, are described in the table. An example is shown in the figure that follows. For more information about Dynamic Destination tables, see [Dynamic Destination Table](#) (on page 31).

**Table 50 IOADEST parameters**

Parameter	Description
GROUP	<p>Specifies the group name for recipients of Shout messages. There can be any number of groups, and the same recipient parameters can appear in more than one group and can be repeated within a particular group. Each group name must begin with one of the following expressions:</p> <ul style="list-style-type: none"> <li>▪ TSO-</li> <li>▪ OPER-</li> <li>▪ OPER2-</li> <li>▪ USERID-</li> <li>▪ U-</li> </ul> <p>Each group can include all the recipient parameters described below in this table.</p>
TSO	Specifies a TSO user-ID.

Parameter	Description
OPER	Specifies an operator console name.
OPER2	Specifies an alternative console name.
USERID	Specifies a MAIL or SNMP destination.
U	<p>Specifies an abbreviation of USERID. Optionally, the parameter can be set to one of the following:</p> <ul style="list-style-type: none"> <li>▪ <i>M: &lt;mail-destination&gt;</i></li> </ul> <p>Where: &lt;mail-destination&gt; must be defined in the MAILDEST member as a NICK name or GROUP.</p> <ul style="list-style-type: none"> <li>▪ <i>S: &lt;snmp-destination&gt;</i></li> </ul> <p>Where: &lt;snmp-destination&gt; must be defined in the SNMPDEST member as a NICK name or GROUP.</p>

The following code shows an example of a IOADEST table:

**Figure 3 IOADEST table example**

```

* TS0 users-id
*-----*
  GROUP=TS0- DEMO- GROUP
  TSO=U001
  TSO=IBMUSER
  TSO=SYS01
*-----*
* operators users-id
*-----*
  GROUP=OPER- DEMO- MI XED
  OPER=CONSOLE1
  OPER2=CONSOLE2
  TSO=OPER01
  U=M: OPER- MAIL           must be defined in MAILDEST
  U=S: OPER- SNMP           must be defined in SNMPDEST

```

## The Mail Destination Table

After completing installation, but before using the MAIL services, you must specify several parameters in the MAIL section of the IOAPARM member in the IOA PARM library. For more information, see [Message Destination Parameters in IOAPARM](#) (on page 115).

The MAILDEST member contains the default values, including the nicknames and group names, of intended recipients of e-mails generated by IOAMAIL. Initially these default values are sample values. The user is required to edit the MAILDEST member and specify actual values in place of the sample values.

The MAILDEST member contains the default values, including the nicknames and group names of intended recipients of e-mails generated by IOAMAIL.

If you do not define the global parameters in the MAILDEST member, the IOAMAIL facility will not function.

For more information about nicknames and group names and their use in the operation of IOAMAIL, see [IOAMAIL](#) (on page 120).

The MAILDEST parameters are described in the table.

**Table 51 MAILDEST Parameters**

Parameter	Description
NICK	Nickname of an e-mail recipient. 1 through 8 characters. Used in combination with the ADDR parameter, which specifies the full e-mail address of the destination. Optional, except that if this parameter is used, the ADDR parameter must also be specified.
ADDR	Full e-mail address of a destination identified by a nickname using the NICK parameter. 1 through 69 characters. Optional, but if the NICK parameter is used, the ADDR parameter must also be specified.
GROUP	Name of group of recipients of e-mail. 1 or more characters. There can be any number of groups, and the same recipients can appear in more than one group. Optional.

## The SNMP Destination Table

After completing installation, but before sending SNMP traps (messages), you must specify several parameters in the SNMP section of the IOAPARM member in the IOA PARM library. For more information, see [Message Destination Parameters in IOAPARM](#) (on page 115).

In addition, you must define the appropriate parameters in the SNMPDEST member. The IOA IOAENV library contains a sample SNMPDEST member, with an example of how to define the SNMPDEST parameters. Copy the SNMPDEST member to the IOA PARM library and define the parameters appropriately.

SNMP destinations consist of host names, IP addresses, nicknames, group names, and port numbers to where an INCONTROL product can send SNMP traps (messages).

The SNMPDEST parameters are described in the table.

**Table 52      SNMPDEST Parameters**

Parameter	Description
HOST	host name (1 through 64 characters) or IP address an SNMP destination  For IPv4 addresses, use the standard dotted decimal notation. Do not use IPv4-mapped IPv6 addresses.  For IPv6 addresses: use the standard notation (39 characters) or the abbreviated form (for example, ::1). See message ECAP9UE for more details.
NICK	nickname of an SNMP destination (1 through 8 characters)
GROUP	group name of a number of SNMP destinations (1 through 8 characters)
PORT	SNMP port number (1 through 65535). If not specified, SNMP port number defaults to 162.

## SNMPDEST Table Example

```

*
NICK=R5,
    HOST=mvs3
NICK=R8, HOST=172. 16. 254. 255
NICK=mvs8- et, HOST=mvs8- et. i sr. bmc. com
NICK=NABUCO, HOST=172. 16. 110. 117
NICK=NAB,
    HOST=nabuco. bmc. com, PORT=65533

NICK=VASILY, HOST=Vasi l y
NICK=ILYA, HOST=172. 16. 240. 90

NICK=l eonardo, HOST=l eonardo. bmc. com

GROUP=SNMP
    NICK=R5
    NICK=VASILY
    NICK=ILYA
    NICK=NABUCO
    HOST=172. 16. 241. 128
    HOST=l eonardo. bmc. com
    NICK=l eonardo

GROUP=users
    HOST=172. 16. 241. 128, PORT=162
    HOST=l eonardo. bmc. com
*
GROUP=mvs
    NICK=R5
    NICK=R8
    NICK=mvs8- et
    HOST=172. 16. 130. 151
    HOST=172. 16. 110. 134, PORT=162

```

## SNMPDEST Destination Coding Rules

- Columns 1 through 71 can contain statement code.
- Any statement can be interrupted by a comma and can be continued on the next line.
- An asterisk in column one makes the entire statement a comment.
- Any number of empty lines are allowed.
- The HOST statement can be a host name or IP address and can optionally have a PORT parameter appended to it.
- The NICK statement serves as a synonym for a host name or IP address. It is provided for ease of use. If used, it must have a HOST parameter and optionally, a PORT parameter appended to it. The NICK parameter is treated as if it is specified in uppercase.
- All NICK parameters must precede the first GROUP parameter.
- The GROUP statement enables the user to send multiple SNMP traps (messages) to many users simultaneously. It is strictly provided for ease of use. If used, it must have any number of HOST and NICK parameters and optionally, PORT parameters appended to it. The GROUP parameter is treated as if it is specified in uppercase.

The following search order is used to determine the SNMP destination:

1. If the target is specified as a standard dotted-decimal notation, it is treated as an IP address and the SNMP trap (message) is sent to it.
2. The GROUP definitions are searched.
3. If not found, the NICK definitions are searched.
4. If not found, an attempt is made to treat the target as an immediate host name and the SNMP trap (message) is sent to it.

## Replacing the SNMP Destination Table (SNMPDEST)

When the respective INCONTROL product monitor is started, the SNMPDEST SNMP Destination table is loaded to memory. The table contains host names, IP addresses, nicknames, group names, and port numbers to which a product can send SNMP traps (messages). When any address or name is added, changed, or deleted, the changed table should be reloaded to memory by one of the following commands:

F CONTROLM,NEWSNMPDST – for Control-M

F CONTROLLO,NEWSNMPDST – for Control-O

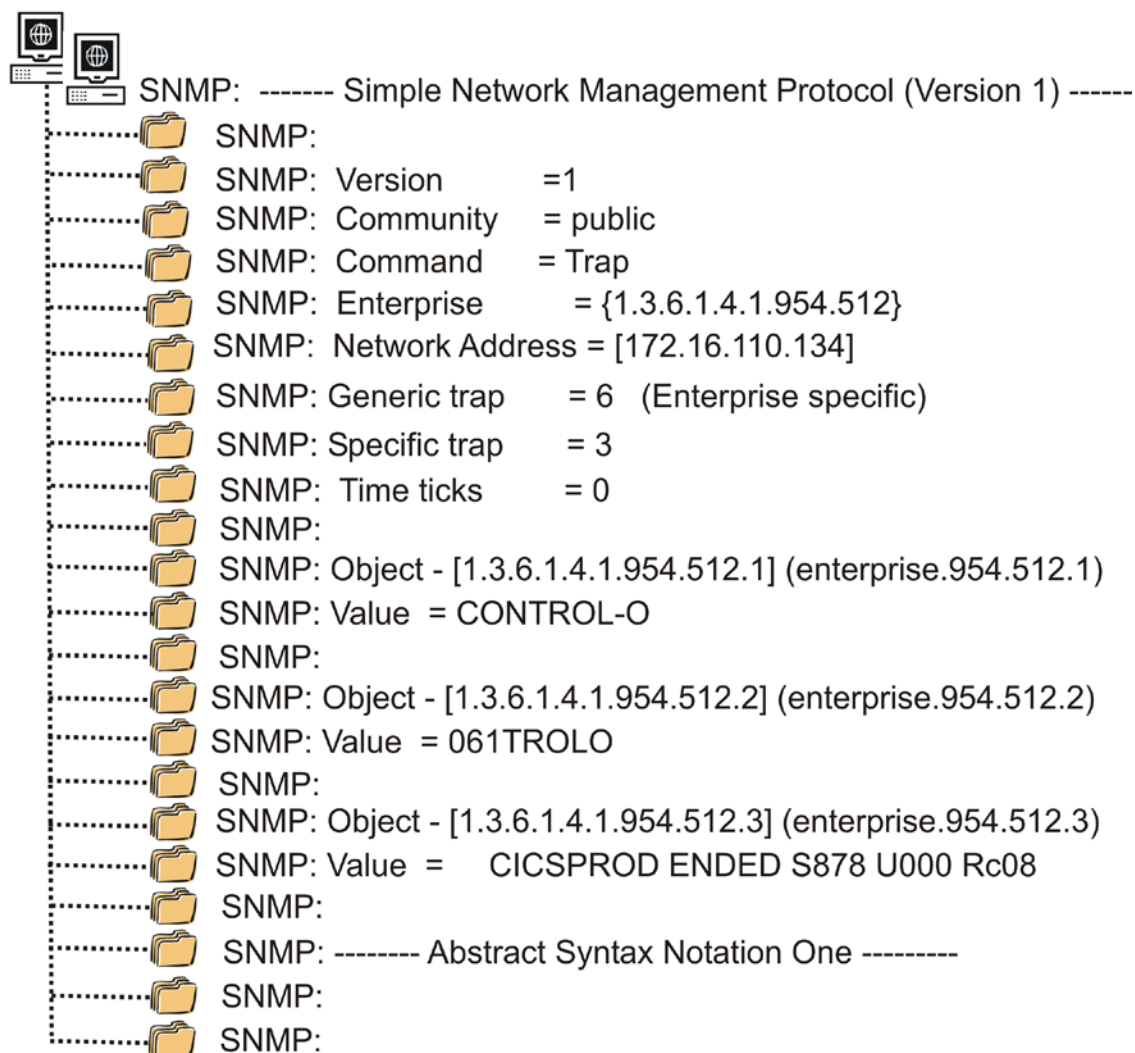
After a few seconds, a message describing the result of the operation is displayed on the operator console.

## Understanding the SNMP Trap Fields Format

This topic explains the SNMP trap fields format generated by the DO SNMP and SHOUT to U-S commands, and is intended for the administrator setting up the SNMP listener.

The figure below shows an example SNMP trap message taken by a sniffer trace. In this example:

- The Generic trap field is set to 6 (Enterprise specific)
- The Enterprise field of the message is set to 1.3.6.1.4.1.954.512 and is defined as follows:
  - 1.3.6.1.4.1 - The IANA-registered Private Enterprise
  - 954 - The vendor (BMC)
  - 512 - Application (Control-M or Control-O)
- The Specific trap field is set to 3. BMC defines the values of the Specific trap field as follows:
  - 3 - Regular
  - 2 - Urgent
  - 1 - Very Urgent
- The three SNMP Value fields are defined as follows:
  - Control-O - The Application name (either Control-M or Control-O)
  - 061TROLO - The Monitor name
  - CICSPROD ENDED S878 U000 RC08 - The message text itself as it is coded in the MESSAGE field of the DO SNMP panel.

**Figure 4 Example SNMP Trap Message**

## IOA MIB Definitions

Following is a MIB for the SNMP traps sent by the following statements:

- DO SNMP statement of Control-O
- DO SHOUT TO U-S: <snmp destination> statement of Control-M.

The MIB is provided in member IOAMIB in the SAMPLE library.

The MIB is used by the software on the trap recipient side to interpret the fields of the trap message.



---

```

IOA-MIB DEFINITIONS ::= BEGIN

-- "This file contains the enterprise specific traps (SNMPv1) sent by
-- Control-M and Control-0 on the Mainframe."

IMPORTS
    TRAP-TYPE
        FROM RFC-1215
    OBJECT-TYPE
        FROM RFC1155-SMI
    DisplayString
        FROM RFC1213-MIB;

-- The OBJECT ID definitions of the enterprise:

IOA          OBJECT IDENTIFIER ::= { enterprises 954 }
IOAtraps     OBJECT IDENTIFIER ::= { IOA 512 }

-- The three specific traps that can be sent:

veryurgentTrap TRAP-TYPE
    ENTERPRISE IOAtraps
    VARIABLES { product, monitor, text }
    DESCRIPTION "very urgent trap"
    ::= 1

urgentTrap TRAP-TYPE
    ENTERPRISE IOAtraps
    VARIABLES { product, monitor, text }
    DESCRIPTION "urgent trap"
    ::= 2

regularTrap TRAP-TYPE
    ENTERPRISE IOAtraps
    VARIABLES { product, monitor, text }
    DESCRIPTION "regular trap"
    ::= 3

-- The three variables that are included in each trap:

product OBJECT-TYPE
    SYNTAX DisplayString
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION "This is the product name, CONTROL-M or CONTROL-0"
    ::= {IOAtraps 1}

monitor OBJECT-TYPE
    SYNTAX DisplayString
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION "This is the job name of the CONTROL-M/0 monitor"
    ::= {IOAtraps 2}

text OBJECT-TYPE
    SYNTAX DisplayString
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION "This is the actual text (message) of the trap"
    ::= {IOAtraps 3}

END

```

---

## Support for SNMPv3 Traps

Control-O and Control-M support SNMPv3 traps by activating the SNMP SUBAGENT feature. When activated, SNMP messages that are generated by DO SNMP statements in Control-O rules or DO SHOUT to U-S statements in Control-M rules, are sent to an SNMP Master Agent.

The SNMP Master Agent is an SNMPD or OSNMPD Server on an OS/390 or z/OS computer, which usually runs on the same mainframe on which Control-O or Control-M resides. Once the messages are received by an SNMP Master Agent, they are forwarded to the SNMP TRAP listeners defined during setup of the SNMP Master Agent.

When the SUBAGENT feature is activated, Control-O and Control-M take on the role of an SNMP sub-agent. Control-O or Control-M send the SNMP traps to the Master Agent, and the Master Agent sends the traps to the SNMP listeners.

The communications between Control-O or Control-M, and the SNMP Master Agent, are carried out by UDP and TCP/IP. The protocol used to communicate with the SNMP Master Agent is the Distributed Protocol Interface (DPI) V1.1.

## Activating the SNMPv3 Traps Feature

1. Activate this feature by changing the MODE statement in the IOAPARM member to MODE=SUBAGENT. This can be performed through ICE in the following step:
  - IOA Customization
  - Major step: 1 IOAPARM Post-Installation
  - Minor Step: 3 Specify parameters for "Mail" options
2. Additionally, specify valid values for the following SNMP parameters in IOAPARM:
  - host is the hostname or IP address of the host where the Master Agent runs  
Default: 127.0.0.1 (the local host)
  - port is the SNMP port on which the Master Agent listens for SNMP requests Default: 161
  - community is the community name defined in the Master Agent setup  
Default: public

When a MODE=SUBAGENT statement is specified in the IOAPARM member then all other NICK and GROUP statements in the SNMPDEST member are ignored.

If MODE is not set to SUBAGENT then it must be set to any other non-blank value, such as MODE=ALONE.

You can switch between activating and deactivating SUBAGENT MODE by changing the MODE parameter and recycling the corresponding monitor(s). If Control-M is used for sending SNMP traps, stop Control-M monitor and then restart it. If Control-O is used for sending SNMP traps, start a new Control-O monitor without stopping the currently running Control-O monitor.

## Replacing the Current Destination Tables

When you want to modify or replace either the Dynamic Destination table or the Mail Destination table, you must follow the procedures described in this section.

## Replacing the Dynamic Destination Table (IOADEST)

The Dynamic Destination table is loaded when the respective INCONTROL product monitor is started. To replace the current Dynamic Destination table with a new one, use the appropriate operator command for each INCONTROL product installed at your site, as described in the following table:

**Table 53 Operator Commands for Replacing the Dynamic Destination member**

Command Syntax	Product
F CONTROLM,NEWDEST	Control-M
F CONTROLD,NEWDEST	Control-D
F CONTROLLO,NEWDEST	Control-O
F IOAFMON,NEWDEST	The IOA Functional monitor used by Control-M/Tape

The IOADEST table is reloaded and an accompanying message is displayed on the operator console from which the modify command was issued, when the monitor resumes job processing.

## Mail Destination Table (MAILDEST)

The Mail Destination table is loaded when the INCONTROL product monitor is started. To replace the current Mail Destination table with a new one, use the appropriate operator command for each INCONTROL product installed at your site.

**Table 54 Operator Commands for Loading a New Mail Destination Table**

Command Syntax	Product
F CONTROLM,NEWMAILDST	Control-M
F CONTROLLO,NEWMAILDST	Control-O

After a few seconds, a message about the result of the operation is displayed on the operator console from which the modify command was issued.

## Message Destination Parameters in IOAPARM

After completing installation, but before sending messages, you must define the appropriate parameters in the IOAPARM member in the IOA PARM library. For email messages, specify the parameters in the MAIL section of IOAPARM describe in the table. For SNMP messages, specify the parameters in the SNMP section of IOAPARM described in the second table. A sample MAIL section of the IOAPARM member is shown below.

**Table 55 Parameters in the MAIL section of the IOAPARM member**

Parameter	Description
SMTPNAME	Global parameter. 1 through 8 characters. Has the same value that the ExtWrtName parameter is set to in the CSSMTP configuration. If ExtWrtName is omitted, then by default, SMTPNAME is equal to the local SMTP STC name. Mandatory.
DFLTSFFX	Global parameter. 1 through 50 characters. The default suffix of the local company e-mail address, in the format mail-id.domain.com. Mandatory.  Note: Do not include the @ character.
DFLTRPTO	This field can hold up to 60 characters. The default full Reply To email address.  On replying, this parameter overrides the From address and can be used where a possible reply to an actual address is needed.
DFLTSNDR	This field can hold up to 25 characters.  This parameter enables the site to set a default sender name to be used in the FROM line of all emails sent by the INCONTROL monitors (for example, Control-M monitor) using the DO MAIL function.  If this parameter does not appear in the MAILDEST parameter member or if it is left empty, the rule or job owner is used as the sender's name.
OWNRSUFX	Identifying information that is appended as a suffix to the name of the owner (the owner ID of the Control-M job). The value of this parameter will be appended to the name of the owner of the Control-M job definition. Up to 30 characters.
HOSTNAME	Global parameter. 1 through 8 characters. Name of the TCP host. Mandatory.
CLASS	Class of sysout from IOAMAIL to SMTP. 1 character. This must be a JES non-held class. Default: A
DEST	Destination for output of IOAMAIL. 1 through 8 characters. Default: LOCAL
FORM	Location of SYSOUT. 1 through 4 characters. The SYSOUT file that is directed to the SMTP will include the value of the FORM parameter.

Parameter	Description
ENVELOPE	<p>Determines how IOAMAIL envelopes the mail message. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ IBM – Use IBM enveloping, which includes these fields: <ul style="list-style-type: none"> <li>▪ HELO SMFID</li> <li>▪ MAIL FROM: &lt;owner@smfid&gt;</li> <li>▪ RCPT TO: &lt;the recipient-address&gt;</li> <li>▪ DATA: &lt;message body&gt;</li> </ul> </li> <li>▪ CA – Use CA (Interlink or TCPAccess) enveloping, which includes these fields: <ul style="list-style-type: none"> <li>▪ X-FROM: &lt;owner@smfid&gt;</li> <li>▪ X-TO: &lt;recipient-address&gt;</li> </ul> </li> </ul>
TIMEZONE	Time zone used to set message transmission time. 5 characters can be used to identify a recognizable time zone. Default: LCL (local time zone)
ATSIGN	The AT SIGN (@) value that will be used as separator between the name and its address. It is useful when a site uses a pagecode in which the @ character is not X'7C'.
ATCHSET	Character set For example, ISO-8859-1.
ATCHENC	Character encoding. For example, 8.

**Table 56 Parameters in the SNMP section of the IOAPARM member**

Parameter	Description
MODE	Global parameter. 1 through 8 characters. Mode of SNMP. Mandatory. For example, SUBAGENT.
HOST	Global parameter. IP address or the host name. Mandatory. Host name (1 through 64 characters) or IP address (standard dotted-decimal notation) of an SNMP destination.
PORT	SNMP port number (1 through 65535). If not specified, SNMP port number defaults to 162.

Parameter	Description
COMMUNITY	<p>This field can hold up to 32 characters.</p> <p>Community in Master Agent setup.</p> <p>If this parameter does not appear in the MAILDEST parameter member or if it is left empty, the rule or job owner is used as the sender's name.</p>

**Figure 5 Sample MAIL section in IOAPARM**

```

*-----
*      MAIL parameters
*-----
MAIL      SMTPNAME=SMTP,          Name of SMTP STC
* The suffix of company's mail address:
      DFLTSFFX=BMC.COM,
* Reply-To Email Address:
      DFLTRPT0=bmc@hotmail.com,
      DFLTSNDR=bmc_sender,        The default 'From' name
      OWNRSUFEX=,                To be appended to DFLTSNDR
      HOSTNAME=MVS3,             Host Name
      CLASS=A,                   Class of SMTP sysout
      DEST=LOCAL,                Destination for mail
      FORM=,                     FORM name for sysout
      ENVELOPE=IBM,              EMAIL format: IBM or CA
      TIMEZONE=,                 Indicates the time zone
      ATSIGN=@,                  Separator the owner from domain
      ATCHSET=ISO-8859-1,        Character set
      ATCHENC=8                  Character encoding
*-----

```

## General IP parameters

The IP section in IOAPARM affects the following components:

- SNMP
- Immediate PC file transfers from online (Option U).
- Delayed PC file transfers by Control-D File Transfer Monitor.

**Table 56a Parameters in the IP section of the IOAPARM member**

Parameter	Description
ISOCKAPI	<p>TCP/IP socket API type.</p> <p>Valid values:</p> <ul style="list-style-type: none"> <li>▪ IBM (default)</li> <li>▪ SAS</li> </ul> <p>When SAS is specified, SAS/C-written modules are used and TCP/IP support will be at the same level as in INCONTROL Version 8.0.00 (IPv6 not supported).</p> <p>When IBM is specified or implied, SNMP and Control-D use IBM C-written modules and support IPv6 and dual TCP/IP stacks.</p>
ISTACK	<p>TCP/IP stack name. This is the started task name of a TCP/IP stack that is active on the z/OS system. If specified, stack affinity is established.</p> <p>Default: The z/OS system's default TCP/IP stack is used.</p> <p>Note: If the z/OS system is not configured for dual stack mode, then the parameter is ignored. But if it is and the stack is not running, then the file or SNMP transmission will not be processed.</p> <p>Warning: Specifying a stack might affect connectivity and hostname resolution. Consult your network administrator.</p>
IPVMODE	<p>TCP/IP protocol implementation level.</p> <p>Valid values:</p> <ul style="list-style-type: none"> <li>▪ DUAL (default)</li> <li>▪ IPV4</li> </ul> <p>When IPV4 is specified, IPv6 is not supported.</p>

## IOAMAIL

IOAMAIL can be called by Control-M and Control-M/Analyzer, using appropriate subparameters under the DO MAIL or DO SHOUT parameters in a job scheduling definition.

IOAAPI can also be used as an entry point to the IOAMAIL facility. For more information on IOAAPI, see [IOAAPI](#) (on page 129).

### Specifying a MAIL Destination

The destinations for e-mail messages sent by IOAMAIL can be specified using several methods, enabling you to send a single e-mail message to several destinations. Different methods can be used for the destinations.

IOAMAIL e-mail destinations can be specified using:

- a fully specified destination name

Example

joe\_smith@acme.com

- a user name, without specifying any more information

IOAMAIL uses the DFLTSSFFX parameter in the IOAPARM member as the default suffix for the user name. The result is a fully specified destination name.

Example

If you specify joe\_smith, and the default suffix in the DFLTSSFFX parameter is acme.com, IOAMAIL completes the resulting e-mail address as joe\_smith@acme.com. (Note that the @ character is taken from the ATSIGN parameter in the IOAPARM member.)

- a nickname, without specifying any more information

IOAMAIL searches for the nickname in the set of predefined nicknames in the MAILDEST member. Each nickname and full e-mail address are specified in separate lines in that member.

For example, if Joe Smith has the e-mail address joe\_smith@acme.com, and is to be given the nickname JOE, the definition will appear in the MAILDEST member as

NICK=JOE

ADDR=JOE\_SMITH@ACME.COM

If the destination of an IOAMAIL e-mail is then specified as joe, the e-mail address results in joe\_smith@acme.com.

- a GROUP name, without specifying any more information

Each IOAMAIL GROUP consists of a group of e-mail recipients. Such a group can comprise any number of e-mail destinations. Each such destination can be defined by reference to

- a full e-mail address
- a user name, where the DFLTSSFFX parameter in the IOAPARM member is used as the suffix
- an IOAMAIL nickname specified as described above



Each destination must be prefixed with the notation TO or CC. When prefixed TO, the e-mail is sent to that destination as an addressee. When prefixed CC, the e-mail is sent to that destination as a copy.

For more information on the MAILDEST member, see [The Mail Destination Table](#) (on page 106).

## IOA support for DO REMEDY

The DO REMEDY option in Control-M for z/OS enables creation of a problem ticket in the Remedy Help Desk system by sending a formatted e-mail to a special mailbox that is defined for this purpose. For more information about the DO REMEDY option, see the *Control-M for z/OS User Guide*.

The Remedy Email Engine reads the incoming message sent to this mailbox and creates problem tickets in the Remedy system, according to the details in each message.

### ➤ To set up IOA support for DO REMEDY

1. Create an account on a POP3 mail server (for example, Microsoft Exchange Server) and record the following details:

- Server name or IP address of the POP3 server (for incoming mail)
- Server name or IP address of the SMTP server (for outgoing mail)
- Server port number used for connecting to the POP3 server (for incoming mail)
- Server port number used for connecting to the SMTP server (for outgoing mail)
- Mailbox name and password
- E-mail address of this new account

BMC recommends that you ensure that the new mail account has been set up correctly by trying to access the account from Microsoft Outlook. In Outlook, select Tools => E-mail Accounts => Add a new E-mail account => POP3. After you have filled in the details, press Test Account Settings.

2. Install and configure the Remedy Email Engine.

Note: Ensure that the Java SDK is already installed on the computer where the Remedy Email Engine will be installed.

For detailed instructions about installing the Remedy Email Engine, see the *Action Request System 6.3 Remedy Email Engine Guide*.

Remedy Email Engine configuration guidelines

- Do not specify an RPC port during the first part of the Remedy Email Engine installation.
- Define the same name for the incoming and outgoing mailboxes during the mailbox configuration part of the Remedy Email Engine installation.
- When you configure the Remedy Email Engine, specify only the host name (without the domain name) as the SMTP server.
- BMC recommends that until DO REMEDY has been tested to work successfully, instead of starting the Remedy Email Engine as a service, start it by running the following batch file. Set the debug flag so that debugging messages will go to the command window.

Edit the emailstart.bat file and add the -Dmail.debug=true option after "%JavaPath%\java":

```
"%JavaPath%\java" -Dmail.debug=true -cp
```

```
emaildaemon.jar;arapi63.jar;arutil63.jar;activation.jar;mail.jar;ima
P
.jar;smtp.jar;pop3.jar;armapi63.jar
com.remedy.arsys.emaildaemon.EmailDaemon
```

The default location of the emailstart.bat file is C:\Program Files\AR System\AREmail.

- There are additional parameters in the Remedy Email Engine mailbox configuration that cannot be set up in the initial prompt windows. You can access the setup values later by selecting Start => Programs => Action Request System => AR System User. After logging on, perform the following steps:
  - a. Select Open => Find and specify AR System Email Mailbox Configuration.
  - b. Select the entry that has type Form and click the Search icon. This process should find two mailboxes: Incoming and Outgoing.
  - c. Select the Incoming mailbox and change Polling Interval (Minutes) to 1.
  - d. Press Advanced Configuration.
  - e. Change Reply With Result to No and save your changes.
  - f. Restart the Remedy Email Engine.
- 3. Copy members REMCONFD and REMTMPL from the IOA.BASE.GENERAL library to the IOA.PARM library.
- 4. Create a copy of REMCONFD in the IOA.PARM library, and name it REMCONF.
- 5. Configure the parameters in member REMCONF, as described in [REMCNCF member](#) (on page 123).
- 6. Create a copy of REMTMPL in the IOA.PARM library, and name it REMTMPLx, where x is the suffix specified in the REMTPLS parameter of the REMCONF member.
- 7. Configure the email template in the REMTMPLx member, as described in [REMTMPLx member](#) (on page 126).
- 8. Define the nickname and email address defined in REMMAIL parameter of REMCONF member in the MAILDEST member (see note below).
- 9. Recycle the Control-M Monitor.

The following MAILDEST parameters, which are related to the Remedy interface in version 6.3.01 and earlier, are no longer supported: RMxSRV, RMxUSR, RMxPSW, RMxSCM, RMxSRC, RMxSTS, RMxTYP. In this list, the value of x may be M, D, or O. If these parameters are set in the MAILDEST member, they will be ignored.

## Understanding the DO REMEDY configuration members

The Remedy interface contains the following configuration members:

- REMCONF member contains general customization parameters for Remedy. For details, see [REMCNCF member](#) (on page 123).
- REMTMPLx member or members contain formatted email templates. For details, see [REMTMPLx member](#) (on page 126).

## REMCNF member

The REMCNF member contains general customization parameters for Remedy.

The REMCNF member contains separate sections for the different IOA products. Each section begins with the COMPID field, and all parameters that follow that field relate to the product specified in it.

A sample member named REMCNFD is provided in IOA.BASE.GENERAL library, which must be manually copied as REMCNF in order to use it. A default REMCNF member is not provided, to avoid overwriting. An asterisk in column 1 indicates a comment.

**Table 57 REMCNF parameters**

Name	Description
COMPID	Begins a component section for an IOA product. Mandatory. The only valid value is M (Control-M).
REMAIL	Nickname of the Remedy email address. Mandatory. Must be defined as a regular email address in the MAILDEST member in the IOA.PARM library.
REMMSUB	Email subject, composed of free text. Default: null. Limited to 60 characters.
REMTPLS	A single character used as a suffix for pointing to the email template to be used when tickets are opened in Remedy. Mandatory. The email template member that will be used is REMTMPLx, where x is the specified suffix. The member will be used from the IOA.PARM library.
REMTRNL	Translate value for URGENCY=L (low). Mandatory. Limited to 60 characters. Composed of free text (not null). Text must be surrounded by single quotes.
REMTRNM	Translate value for URGENCY=M (medium). Mandatory. Limited to 60 characters. Composed of free text (not null). Text must be surrounded by single quotes.
REMTRNH	Translate value for URGENCY=H (high). Mandatory. Limited to 60 characters. Composed of free text (not null). Text must be surrounded by single quotes.

Name	Description
REMTRNU	<p>Translate value for URGENCY=U (urgent). Mandatory. Limited to 60 characters.</p> <p>Composed of free text (not null). Text must be surrounded by single quotes.</p>
REMTRNB	<p>Translate value for URGENCY= (blank). Mandatory. Limited to 60 characters.</p> <p>Composed of free text (not null). Text must be surrounded by single quotes.</p>

## Sample REMCONF member

The values specified in the REMTRNx parameter are used to replace the URGENCY value specified in the rule Control-M rule with the value that should be used in the Remedy ticket. Refer to "%%URGENCY%%" in [REMTMPLx member](#) (on page 126).

```

*****
** REMCONF - Remedy Interface Configuration                **
**                                                         **
** The member should be copied as REMCONF and to reside in  **
** the IOA.PARM library.                                     **
**                                                         **
** Please refer to the INCONTROL for z/OS Administrator     **
** Guide for more information.                               **
**                                                         **
** Notes:                                                  **
** -----                                                  **
**                                                         **
** (1) A sample of the a Remedy Email template (pointed by  **
** the REMTMPLS= parameter) can be found in member         **
** REMTMPL.                                                 **
**                                                         **
** (2) Use the following REMTRNx settings for               **
** Remedy release 6:                                       **
**                                                         **
**     REMTRNL=' Low'                                     **
**     REMTRNM=' Medi um'                                  **
**     REMTRNH=' Hi gh'                                    **
**     REMTRNU=' Urgent'                                    **
**     REMTRNB=' Medi um'                                  **
**                                                         **
** Use the following REMTRNx settings for                   **
** Remedy release 7:                                       **
**                                                         **
**     REMTRNL=' 4- Low'                                    **
**     REMTRNM=' 3- Medi um'                                **
**     REMTRNH=' 2- Hi gh'                                  **
**     REMTRNU=' 1- Urgent'                                  **
**     REMTRNB=' 3- Medi um'                                **
**                                                         **
** (3) Email nick name defined by parameter REMMAIL= should **
** be defined in member MAILDEST.                           **
**                                                         **
*****
** Control - M Section                                     **
**                                                         **
COMPID=M
REMAIL=CTMRMDY
REMSUB=
REMTMPLS=M
REMTRNL=' Low'
REMTRNM=' Medi um'
REMTRNH=' Hi gh'
REMTRNU=' Urgent'
REMTRNB=' Medi um'

```

The sample REMCONFD member is similar.

## REMTMPLx member

The REMTMPLx member holds the email template to be used for opening a ticket in Remedy. The REMTMPLS parameter in the REMCONF member points to the REMTMPLx email template member, where x is a free suffix pointing to the required member.

Basic configuration information (such as Remedy server name, schema name, user name, and password) is an integral part of the template.

The member supports mixed case characters (CAPS OFF).

Each line is limited to 70 alphanumeric characters.

A sample template named REMTMPL is provided, and includes separate samples to be used with Remedy 6 and Remedy 7. Instructions on how to configure the member, including the configuration parameters, are included as comments. The sample must be manually copied as REMTMPLx, where x is the suffix specified in the REMTMPLS parameter.

The email will be sent to the address pointed by the nickname specified in the REMMAIL parameter, and the email subject is set as specified in the REMMSUB parameter (both of which are located in the REMCONF member).

When the email is built, the template strings are replaced with the values as described in the table.

**Table 58 REMTMPL template variables**

String in template	Replace by Value	Comments
%%SUMM%%	The SUMM field as specified in the Control-M rule.	Mandatory. No default.
%%DESC%%	The DESC field as specified in the Control-M rule.	Mandatory. No default.
%%URGENCY%%	The URGENCY field as specified in the Control-M rule. This takes place after the appropriate translation using the REMTRNx parameters in the REMCONF member.	Default: the value specified in the REMTRNB parameter in the REMCONF member.
%%USER%%	The user ID that created the Control-M rule that issued the Remedy ticket opening request.	Mandatory. No default.

## Sample template

```

*****
** REMTMPLx - Remedy Email Template **
** **
** This is a sample of a Remedy Email template to be used in **
** order to open a ticket in Remedy. **
** **
** The email template should reside in IOA.PARM library and to **
** be named as REMTMPLx where x is the character specified in **
** parameter REMTMPLS= in member IOA.PARM(REMCONF). **
** **
** This sample includes 2 separate sections: **
** - The first section should be used with Remedy release 6. **
** - The second section should be used with Remedy release 7. **
** **
** ----- **
** Steps needed to be done to customize the template: **
** **
** a. Select the sample appropriate to your Remedy **
** level (6 or 7). **
** **
** b. Remove (or comment using an asterisk in column 1) **
** the sample related to the Remedy level not used on **
** your site. **
** **
** c. Fill in the customization parameters as defined in **
** your site: **
** **
** - The Remedy schema name used for opening the ticket **
** - The Remedy server name **
** - The Remedy user name **
** - The Remedy User password **
** **
** d. Add additional Remedy fields that are required on **
** on your site as additional lines at the bottom of **
** the template. **
** **
** e. The member should be placed in the IOA.PARM library **
** and to be named REMTMPLx where X is the suffix **
** specified in parameter REMTMPLS in member REMCONF **
** which resides in the same library. **
** **
** Please refer to the INCONTROL for z/OS Administrator **
** Guide for more information. **
** **
*****
** Remedy 6 sample **
** ----- **
** Use the following section for Remedy release 6. **
** Don't forget to remove the section for Remedy release 7 below. **
*****
Schema: HPD: HelpDesk
Server: remsrvr
Login: Demo
Password:
Action: Submit
Format: Short
Summary* ! 8!: %%SUMM%%
Description* !240000007!: %%DESC%%
Category* !200000003!: Software
Type* !200000004!: Other
Item* !200000005!: Other
Login*+ !240000005!: %%USER%%
Name*+ !240000001!: %%USER%%
Source* !260000128!: Email
Solution Details !260000503!:
Status* ! 7!: New

```

```

Case Type* !260000130!: Incident
Urgency !240000009!: %%URGENCY%%
**
*****
** Remedy 7 sample **
** ----- **
** Use the following section for Remedy release 7. **
** Don't forget to remove the section for Remedy release 6 above. **
*****
char-set: windows-1252
Schema: HPD: IncidentInterface_Create
Server: remsrvr
Login: Demo
Password:
Action: Submit
Description !1000000000!: %%SUMM%%
Service Type !1000000099!: User Service Request
Status ! 7!: New
Details !1000000151!: %%DESC%%
First Name* !1000000019!: App
Last Name* !1000000018!: Admin
First Name+ !1000005783!: %%USER%%
Last Name+ !1000005782!: %%USER%%
Impact* !1000000163!: 3-Moderate/Limited
Urgency* !1000000162!: %%URGENCY%%
!1000000076!: CREATE
**
*****
** Version 7.6.04 **
** If you want to specify values for the First Name+ and **
** Last Name+ parameters in the REMTMPLx member, you must define **
** these values as user with valid First and Last names in Remedy, **
** then remove the asterisks from the First Name+ and Last Name+ **
** fields, and then specify values of the defined First and Last **
** names. **
*****
char-set: windows-1252
Schema: HPD: IncidentInterface_Create
Server: remsrvr
Login: Demo
Password:
Action: Submit
Description !1000000000!: %%SUMM%%
Status ! 7!: New
Details !1000000151!: %%DESC%%
First Name* !1000000019!: App
Last Name* !1000000018!: Admin
*Uncomment the First Name+ and Last Name+ if defined in Remedy
*First Name+ !1000005783!: %%USER%%
*Last Name+ !1000005782!: %%USER%%
Service Type !1000000099!: 1
Impact* !1000000163!: %%URGENCY%%
Urgency* !1000000162!: %%URGENCY%%
!1000000076!: CREATE
RepSource !1000000215!: email

```

The sample REMTMPL member is similar.

In the sample provided for Remedy version 7.6.04, the lines for the First Name+ and Last Name+ parameters are commented out with asterisks (\*) so that by default a Remedy ticket is produced.

If you want to specify values for the First Name+ and Last Name+ parameters in the REMTMPLx member, you must define these values as a user with valid first and last names in Remedy, then remove the asterisks from the First Name+ and Last Name+ fields, and specify the values of the defined First and Last names.



## IOAAPI

IOAAPI, the IOA Application Program Interface, provides an interface to some IOA services.

### Supported Services

IOAAPI currently supports the services described in the following table:

**Table 59 Services Supported by IOAAPI**

Service	Description
COND	Processes a condition file
MAIL	Sends messages by e-mail
LOG	Selects records from the log

### Access to IOAAPI

IOAAPI can be accessed by the following means:

- a batch program
- a batch statement
- use of the TSO command processor
- a user application program

### Service Types Syntax

A service call is made using the following syntax:

---

```
service_type service_parms
```

---

where

- *service\_type* is one of the supported services
- *service\_parms* are parameters sent along with the *service\_type*

To write a comment in a call string, place an \* (asterisk) before the first character. Use this technique if, for example, you want a call string to be omitted from one run of a job.

### COND Service

The following is the syntax of a request for the COND service:

```
COND request_type condition_name date
```

where:

- request\_type is one of the following types of request:
  - ADD
  - DELETE
  - CHECK
- condition\_name is the name of the condition, from 1 through 40 characters
- date is the date in mmdd format

## Return Codes

The ADD request returns condition code 0 when successfully executed and the condition code does not exist. If the condition\_name already exists, the condition code is 8.

The DELETE request returns condition code 0 when successfully executed and the condition name exists, unless there was no condition\_name, in which case the condition code is 8.

Details of all the COND return codes appear in the following table:

**Table 60 IOAAPI COND Return Codes**

Return Code	Explanation
0	OK
4 through 56	CTMURS error code
	The CHECK request returns condition code 8 when the condition_name does not exist. If it does exist, the code returned is 0.
100	PARM string parsing error
104	Unable to get storage
108	Unable to load module
112	Unable to build MCT
116	Failed to open a file
120	Error in calling sequence for command processor
124	Unrecognized service type
128	IEANTXX error
132	Error in IF statement

## Examples

```
COND ADD A_LONG_CONDITION_NAME 0822
```

```
COND DELETE CONDITION_ALPHA 1231
```

```
COND CHECK ANY-CONDITION 0407
```

## MAIL Service

Before using this service, ensure that you are familiar with [IOAMAIL](#) (on page 120).

The MAIL service can only be used in batch and API runs.

The following is the syntax of a request for the MAIL service:

```
MAIL request_type (content)
```

where

- *request\_type* is one of the types of request shown in the following table
- *content* of the request type, as explained under "Description" in the following table

**Table 61 MAIL Request Types**

Request Type	Description
TO	Mandatory. Address of recipient of the e-mail, specified in one of the ways described in <a href="#">IOAMAIL</a> (on page 120). Many TO requests can be specified in successive lines in one MAIL request.
CC	Optional. Address of recipient of a copy of the e-mail, specified in one of <a href="#">IOAMAIL</a> (on page 120) ways described in <a href="#">IOAMAIL</a> (on page 120). Many CC requests can be specified in successive lines in one MAIL request.
SUBJ	Optional. Text for the subject field of the e-mail. If more than one SUBJ is specified, the last specified is used.
TEXT	Mandatory. Text for the body of the e-mail message. Up to 10 TEXT lines can be specified.
SEND	Mandatory. This Request Type has no text field. It sends the prepared e-mail. The message subject and text lines of the e-mail are cleared after sending is complete.
NEWL	This Request Type has no text field. It clears the recipient lists, both TO and CC.

## Return Codes

Details of all the MAIL return codes appear in the table.

**Table 62 IOAAPI MAIL Return Codes**

Return Code	Explanation
0	OK
4	From IOAMAIL
8	From IOASMTP
100	PARM string parsing error
104	Unable to get storage
108	Unable to load module
140	Attempting to request MAIL by means of a PARM or from TSO command processor
144	Too many text lines
148	Unrecognized MAIL parameter

## Example

The following is an example of a MAIL request:

```
MAIL TO JOHN_D@ACME.COM
MAIL TO GEORGE
MAIL CC CLARA
MAIL SUBJ subject-header-text
MAIL TEXT text-line1
MAIL TEXT text-line2
MAIL TEXT text-line3
MAIL SEND
```

## LOG Service

The LOG service can only be used in batch and API runs. The syntax of a request for the LOG service is

---

```
LOG request_type [parm1] [parm2]
```

---

where

- *request\_type* is one of the types of request shown in the table below
- *parm1* and *parm2* depend on the type of request specified as *request\_type*

**Table 63 LOG Service Request Types**

Request Type	Description
DATE	<p>Only records between the two dates specified are to be selected. If DATE is not specified, records of any date can be selected.</p> <p>The syntax of the request is</p> <pre>DATE BETWEEN yymmdd AND yymmdd</pre>
TIME	<p>Only records between the two times specified are to be selected.</p> <p>If DATE is not specified, the TIME parameter is ignored.</p> <p>If DATE is specified but TIME is not specified, all times can be selected.</p> <p>The syntax of the request is</p> <pre>TIME BETWEEN hhmm AND hhmm</pre> <p>where <i>hh</i> follows the 24-hour clock format.</p>
CODE	<p>Provides a list of message codes. Depending on the syntax of the request, this request code may (using CODE IN) specify the message codes to be included in the list, or (using CODE NOT IN) those to be excluded from the list.</p> <p>The syntax of the request is</p> <pre>CODE IN code1 code2 code3 ...</pre> <p>or</p> <pre>CODE NOT IN code4 code5 code6 ...</pre> <p>When many CODE requests are specified, the program joins them into one list containing a maximum of 100 codes. However, all CODE requests must be of the same type, that is, they must all be either IN or NOT IN.</p> <p>If CODE is not specified, all codes can be selected.</p>

Request Type	Description
FILE	<p>All selected log records are written to a file. The user must supply a JCL DD statement specifying the file.</p> <p>The syntax of the request is</p> <p><code>FILE ddname</code></p> <p>The default value of <code>ddname</code> is DAAPIOUT.</p>
	<p>Notes:</p> <p>The DAAPIOUT default should not be used when the selected log records have to be written to a file.</p> <p>The file should be allocated with LRECL=200 and RECFM=FB.</p>
RECORD	<p>The records selected are passed to the calling API. This request type is ignored where there is no API.</p>
	<p>Note: FILE and RECORD are mutually exclusive. If neither is specified in an API environment, the default is RECORD.</p>
FIND	<p>Perform the selection of log records as specified by the other parameters (that is, DATE, TIME, CODE, FILE, and RECORD).</p> <p>If FILE was specified, all records are written to file.</p> <p>If RECORD was specified, the first record is pointed by the register R1. The following records are passed by the NEXT request.</p>
NEXT	<p>Passes one log record to the calling program. This request type is valid only in an API environment. On return to the API, if the record was passed OK, the value in register R15 is zero, and R1 points to the next record. When the end of the LOG is reached, the value in register R15 is 4.</p>

## Return Codes

Details of all the LOG return codes appear in the table.

**Table 64 IOAAPI LOG Return Codes**

Return Code	Explanation
0	OK.
4	In RECORD mode, end of log reached.
8	Error. This return code is accompanied by an explanatory message.
100	Parameter string error.
104	Unable to get storage.
116	Failed to open a file.
140	Calling sequence for a CP IN error
148	Request type unknown.
152	Too many codes in list.
156	The request includes both CODE IN and CODE NOT IN request types.
160	Error in the DATE or TIME request.
164	Either both FILE and RECORD request types requested, or neither was requested.
168	The request included a NEXT without a preceding FIND.
172	FIND was called twice.

## Example

The following is an example of a LOG request:

```
LOG DATE BETWEEN 010815 AND 010831
LOG TIME BETWEEN 0800 AND 1800
LOG CODE IN SEL154L SQR606I
LOG CODE IN YQR312I
LOG FILE MYFILE
LOG FIND
```

## Using a Batch Program

Within a batch program, a service request is submitted as the PARM field specification in an EXEC statement.

### Example

```
//EXAM1      EXEC PGM=IOAAPI
//          PARM=' COND ADD COND1 0401'
//STEPLIB DD DISP=SHR, DSN=dataset1
//          DD DISP=SHR, DSN=dataset2
//DAAPI OUT DD SYSOUT=*
//DAPARM DD DISP=SHR, DSN=dataset3
//DACNDF DD DISP=SHR, DSN=dataset4
//DALOG DD DISP=SHR, DSN=dataset5
```

where

- *dataset1* and *dataset2* are STEPLIB libraries, set on installation
- *dataset3* is the Parameters Dataset file, and is mandatory
- *dataset4* is the Conditions file used for COND requests
- *dataset5* is the Log file used for LOG requests

Only one request can be made in a batch program.



## Using Batch Statements

Requests are passed as an input file. Each record is 80 bytes in length, but only the first 71 bytes are used.

### Example

The following example illustrates the use of a batch statement to issue a series of requests:

---

```
//EXAM2      EXEC PGM=IOAAPI
//STEPLIB DD DISP=SHR, DSN=dataset1
//          DD DISP=SHR, DSN=dataset2
//DAAPIOUT DD SYSOUT=*
//DAPARM DD DISP=SHR, DSN=dataset3
//DACNDF DD DISP=SHR, DSN=dataset4
//DALOG DD DISP=SHR, DSN=dataset5
//DAAPIPRM DD *
      COND DELETE COND2 0115
      COND ADD COND3 0701
      COND CHECK COND4 1231
      MAIL TO USER2
      MAIL CC USER3@ACME.COM
      MAIL SUBJ RUN ENDED
      MAIL TEXT RUN OF TODAY FINISHED OK
      MAIL SEND
      LOG DATE BETWEEN 010401 AND 010415
      LOG CODE IN MT0356I MT0357I
      LOG FILE PRINT
      LOG FIND
//
```

---

where

- *dataset1* and *dataset2* are STEPLIB libraries, set on installation
- *dataset3* is the Parameters dataset file; this must be present
- *dataset4* is the Conditions file used for COND requests
- *dataset5* is the Log file used for LOG requests

## Conditional Input

Requests passed from a batch statement can be conditional, using the following syntax:

```
IF LASTCC condition number THEN
    statement_1
    statement_2
    statement_3
    .....
ELSE
    statement_4
    statement_5
    statement_6
    .....
ENDIF
```

where

- *LASTCC* is the condition code returned by the last executed request
- *condition* is either EQ (Equal) or NE (Not Equal)
- *number* is a numeric value from 1 through 3 digits, for example 4, 04, or 004

Tokens in the IF statement must be separated by blanks. Nested IF statements are not supported. The whole IF statement must reside in the same input record.

ELSE and its group of statements are optional. If used, it must be the only token in a record.

ENDIF must be the only token in a record.

### Example

```
COND CHECK CONDITION_A 0104
IF LASTCC EQ 8 THEN
    COND ADD CONDITION_A 0104
ELSE
    COND ADD CONDITION_B 0104
    MAIL TO USER1
    MAIL TEXT CONDITION_B ADDED
    MAIL SEND
ENDIF
```

## Using the TSO Command Processor

A request can be made using the TSO command processor. The command is passed as a PARM to the command processor.

The format of the command is

```
IOAAPI COND condition_request condition_name date
```

## Using a User Application Program

Any number of requests can be made using a user application program.

In this guide, CL $nn$  means a character field  $nn$  characters in length, padded with blanks to the right.

When the request is made, the following array of addresses is passed:

- A(*string1*), where *string1* is CL8'IOAAPI'
- A(MCTADDR)
- A(*string2*), where *string2* is one of the following, as appropriate:
  - CL8'COND'
  - CL8'MAIL'
  - CL8'LOG'

In the case of each of the services to which these strings refer, that is, COND, MAIL, and LOG, additional addresses are passed. These additional addresses vary according to the service requested, as explained in the following sections.

### COND Service Additional Addresses

For more information on the COND service, see [COND Service](#) (on page 129).

The additional addresses that are passed when the COND service is requested are:

- A(*string3C*), where *string3C* is CL8'*request\_type*'
- A(*string4C*), where *string4C* is CL39'*condition\_name*'  
A(*string5C*), where *string5C* is CL4'*date*'

The *request\_type*, *condition\_name*, and *date* strings have the meanings explained in [COND Service](#) (on page 129).

### MAIL Service Additional Addresses

For more information on the MAIL service, see [MAIL Service](#) (on page 131).

Additional addresses that are passed when the MAIL service is requested are:

- A(*string3M*) where *string3M* is CL8'*request\_type*'
- A(*string4M*) where *string4M* is CL70' *content*

The *request\_type* and *content* strings have the meanings explained in [MAIL Service](#) (on page 131).

### LOG Service Additional Addresses

For more information on the LOG service, see [LOG Service](#) (on page 133).

The additional addresses that are passed when the LOG service is requested depend on the request type, as follows:

- *A(string3L)* where *string3L* is CL8'*request\_type*'
- *A(string4L)* and *A(string5L)*

where

- *request\_type* is one of the LOG request types described in [LOG Service](#) (on page 133).
- the contents of *string4L* and *string5L* depend on the type of request specified in *string3L* as the *request\_type*, as explained in [LOG Service](#) (on page 133).

## DATE Request Type Additional Addresses

In the case of the DATE request type, the additional addresses are as follows:

- *A(string3LD)*, where *string3LD* is CL8'DATE'
- *A(string4LD)*, where *string4LD* is the DATE BETWEEN ("from") date in the format CL8'*yymmdd*'
- *A(string5LD)*, where *string5LD* is the DATE AND ("until") date in the format CL8'*yymmdd*'

For more information on DATE, DATE BETWEEN, and DATE AND, see [LOG Service](#) (on page 133).

## TIME Request Type Additional Addresses

In the case of request type TIME, the additional addresses are as follows:

- *A(string3LT)*, where *string3LT* is CL8'TIME'
- *A(string4LT)*, where *string4LT* is the TIME BETWEEN ("from") time in the format CL8'*hhmm*'
- *A(string5LT)*, where *string5LT* is the TIME AND ("until") time in the format CL8'*hhmm*'

For more information on TIME, TIME BETWEEN, and TIME AND, see [LOG Service](#) (on page 133).

## CODE Request Type Additional Addresses

In the case of request type CODE, the additional addresses are as follows:

- *A(string3LC)*, where *string3LC* is CL8'CODE'
- *A(string4LC)*, where *string4LC* is either CL8'IN' or CL8'NOT IN'
- *A(string5LC)*, where *string5LC* is CL70'*code1 code2 code3 ...*'

For more information on CODE, IN, and NOT IN, see [LOG Service](#) (on page 133).

## FILE Request Type Additional Addresses

In the case of request type FILE, the additional addresses are as follows:

- *A(string3LFL)*, where *string3LFL* is CL8'FILE'
- *A(string4LFL)*, where *string4LFL* is CL8'*ddname*'  
The string *ddname* is a DD name of up to 8 characters, and is fully explained, together with its default value of PRINT, in [LOG Service](#) (on page 133).

## RECORD Request Type Additional Addresses

In the case of request type RECORD, there is a single additional address, namely, *A(string3LR)*, where *string3LR* is CL8'RECORD'.

For more information, see [LOG Service](#) (on page 133).

## FIND Request Type Additional Addresses

In the case of request type FIND, there is a single additional address, namely, *A(string3LFN)*, where *string3LFN* is CL8'FIND'.

For more information, see [LOG Service](#) (on page 133).

## NEXT Request Type Additional Addresses

In the case of request type NEXT, there is a single additional address, namely, *A(string3LN)*, where *string3LN* is CL8'NEXT'.

For more information, see [LOG Service](#) (on page 133).

# IOA Variable Database Facility

The IOA Variable Database facility is comprised of a series of screens and a set of files that enable you to view, create and modify AutoEdit variables that are made available globally to INCONTROL products.

The IOA Variable Database facility is available to Control-M only with the CMEM monitor active, or when the Control-O monitor is active.

IOA variable databases are stored in a common storage area on a computer, and are organized into databases. Changes to the value of an AutoEdit variable in an IOA variable database can be accessed by all Control-M jobs or Control-O rules on that computer, or, if desired, in the Sysplex if that computer is part of a Sysplex.

When an INCONTROL product starts, the product reads the databases defined in the IOA Variable Database facility and loads the databases' AutoEdit variables into memory.

Control-O users can create and access an unlimited number of AutoEdit databases. Other INCONTROL products, such as Control-M, can only access one AutoEdit database, named IOAVAR.

IOA Variable Database facility databases are specified in the global member list, which is the list of members referenced by DD statement DAGLBLST of the INCONTROL product monitor procedure (currently, either CONTROLO or CTMCMEM). For more information about the global member list, see [Defining a New Database](#) (on page 160).

The IOA Variable Database facility consists of the following files, which are allocated during IOA installation. These files are used to copy information into memory on each computer in which an INCONTROL product is working.

**Table 65 IOA Variable Database Facility Files**

File	Description
Database file (DBS)	Contains information about each AutoEdit database, listed in the Definition file. This information is displayed in the List of Databases screen.
Column file (COL)	<p>Contains information about columns in all databases listed in the Columns file. Columns represent the attributes (fields) stored in each database. The columns for a specific database are displayed in the List of Columns screen for that database.</p> <p>The IOAVAR database file, which is the only database Control-M (and other INCONTROL products) can access, has two fixed columns: VARNAME and VALUE.</p> <p>The columns of other databases, accessible by Control-O only, can be defined as you need.</p>
Variables file (VAR)	This file stores the actual values for each AutoEdit variable in the database. This information is displayed in the Display screen.

The IOA Variable Database facility files are IOA Access Method files. Each file consists of two operating system files: a data component and an index component. For more information about the IOA Access Method, see [IOA Concepts and Components](#) (on page 17).

Updates and additions made to the AutoEdit variables directly in memory (such as by rules or KOA scripts) are kept in memory by the INCONTROL product and are available to all other jobs, rules, and so on. While the INCONTROL product is active, a specific database (or all databases) can be reloaded from or written to the IOA Variable Database facility files using operator commands LOADGLOBAL and WRITEGLOBAL. When the INCONTROL product is stopped, command WRITEGLOBAL is automatically performed to update all databases with the latest information.

If Control-O is installed, the CMEM facility is executed by the Control-O monitor instead of the CMEM monitor. In this case, references in this section to the CMEM monitor apply to the Control-O monitor, and operator commands contain the string CONTROLO instead of CTMCMEM.

Also, AutoEdit databases are not stored as partitioned datasets. Therefore, the AutoEdit variables stored in these databases cannot be accessed by Control-M %%LIBSYM and %%MEMSYM control statements. For Control-M to access these variables, you must explicitly state its path name and variable name in job definition statements such as SET VAR and DO SET.

The complete format for accessing an AutoEdit variable stored in a database is

```
%%\<product>\<application>\<group>\<memname>\varname>
```

When specifying the name of an AutoEdit variable, you can use shortcuts. For example, if the variable is in the current directory, you do not need to specify the entire path name (the variable name alone suffices). For more detailed information on the path name, see [Displaying the Values of Databases Screen](#) (on page 154).

## Availability and Implementation Across INCONTROL Products

The IOA Variable Database facility is available for the following INCONTROL products:

**Table 66      Availability of the IOA Variable Database Facility**

Product	Implementation Notes
Control-M with CMEM	The only database that Control-M can access is the IOAVAR database.
Control-O	Control-O can access any number of databases. These databases are structured in row and column format (the typical database structure) and can be of standard type, XAE Type 1, or XAE Type 2.  When both Control-O and Control-M (CMEM) are installed, Control-M can still only access the IOAVAR database.
	Note: In addition to variables stored in databases, Control-O can also access variables stored in global members. For more information, see <a href="#">Control-O</a> (on page 551).

### IOAVAR Database

The IOAVAR database, which is loaded into memory because it is specified in member IOAGLBVL in the IOAENV library, is unlike other databases in the IOA Variable Database facility.

- It is the only database that Control-M can access.
- It consists of a series of variable names and corresponding variable values, instead of user-defined rows and columns (fields).

The IOAVAR database can be of standard type or of XAE Type 2. Therefore, it is defined as either DBINOUT or S2INOUT in member IOAGLBVL in the global member list (the concatenation of files specified in DD statement DAGLBLST).

For more information about the global member list and XAE databases, see [Defining a New Database](#) (on page 160) and [Using XAE Type Databases Instead of Standard Type Databases](#) (on page 165), respectively.

### Sharing the Global Variables database

The IOA and Control-O Global Variables database can be shared between Control-M, Control-O, online users, the Control-M application server, IOA APIs, and Control-O XAM. The Control-O or CMEM monitors using shared disks in non-SYSPLEX environments and in the Coupling Facility in SYSPLEX, can share the Global Variables database. The global variables are loaded and held in memory, which is separate on each LPAR where Control-O or CMEM is being run.

## Sharing in non-SYSPLEX environments

In a non-SYSPLEX environment, if you change a variable database and issue a LOADGLOBAL command, the only LPAR memory that is changed is for LPARs where the LOADGLOBAL command was issued. When the Control-Os are stopped, the sequence of the WRITEGLOBAL command (which is issued when Control-O is stopped) determines how the variable database is updated.

## Sharing in SYSPLEX environments

In a SYSPLEX environment that uses XAE type 1 CF structures (described in [Using XAE Type Databases Instead of Standard Type Databases](#) (on page 165), if you change a variable database and issue a LOADGLOBAL command, the only LPAR memory that is changed is for LPARs where the LOADGLOBAL command was issued, and the CF structure that is part of the specific system is changed. When the Control-Os are stopped, the sequence of the WRITEGLOBAL command (which is issued when Control-O is stopped) determines how the variable database is updated.

In a SYSPLEX environment that uses XAE type 2 CF structures (described in [Using XAE Type Databases Instead of Standard Type Databases](#) (on page 165), if you change a variable database and issue a LOADGLOBAL command, the memory of all LPARs is changed, no matter where the LOADGLOBAL command was issued. The CF structure is changed. When the Control-Os are stopped and a WRITEGLOBAL command is issued, the sequence is not important, as the variable database is already in synch. A WRITEGLOBAL is done when CTO is stopped.

## Navigating and Using the IOA Variable Database Facility

To enter the IOA Variable Database facility, select option IV in the IOA Primary Option menu. The IOA Variables entry panel is displayed.

**Figure 6 IOA Variables Entry Panel**

----- IOA Variables - ENTRY PANEL ----- (IV)	
COMMAND ===>	
SPECIFY DATABASE NAME	
DATABASE ===>	(Blank for Database selection list)
MODE ===>	(Blank or ADMIN for Administration mode)
USE THE COMMAND "SHPF" TO SEE PFK ASSIGNMENT	
16. 21. 43	



- To display the list of all databases: Press Enter. The List of Databases screen is displayed. For more information, see [List of Databases Screen](#) (on page 146).

Control-O installations can access an unlimited number of databases. Control-M and other INCONTROL product installations can access the IOAVAR database only (even if other databases are displayed).

- To display the Values of Database screen of a specific database: Type the database name in the DATABASE field on the Entry Panel and press Enter.

An asterisk (\*) can be used as a mask character in the DATABASE field of this screen.

When entering either the List of Databases screen or the Values of Database screen, you can either enter as a regular user or an administrator, as follows:

- To enter the IOA Variables Database facility as a regular user: Leave the MODE field blank. In this case, you will be able to view the variables in the databases, but you will not be able to perform administration functions.
- To enter the IOA Variables Database facility with full administrator functionality: Type ADMIN in the MODE field.

Security module IOASE42 prevents regular users from accessing the IOA Variables Database facility as an administrator. For more information on this security module, see the *INCONTROL for z/OS Security Guide*.

In ADMIN mode, only those variables actually written to the IOA Global Variable database are displayed. For example, if using the SET command of the Control-M CTMAPI utility, you prepare a global variable to be written to the database, without subsequently issuing the CKP command, such a variable is not displayed in ADMIN mode.

## List of Databases Screen

**Figure 7**      **List of Databases Screen**

[illegible]

The List of Databases screen displays a list of the databases currently defined. This screen can be entered using the IOA Variables entry panel or when returning from the List of Columns screen. For more information, see [List of Columns Screen](#) (on page 148).

A short description is displayed for each database. This description is specified either when creating a new database, or through Option U. For more information, see [Options of the List of Columns Screen](#) (on page 149).

For a database to be loaded into memory, the database name must be specified in one of the members referenced and concatenated by the DAGLBLST DD statement of the product's monitor.

## Options of the List of Databases Screen

The following options, listed at the bottom of the screen, can be applied to any row in the List of Databases screen. Specify the desired option in the OPT field next to the database name, and press Enter.

**Table 67 Options of the List of Databases Screen**

Option	Description
S (SELECT)	Display and edit the list of the columns in the database. For more information, see <a href="#">List of Columns Screen</a> (on page 148).
I (INSERT)	<p>Insert a new database in the list. The New Database window is displayed, prompting you to specify database name, description, and the maximum number of rows.</p> <p>The new database is added after the database that was marked with an "I". When the List of Databases screen is redisplayed, the databases are sorted in alphabetical order. To redisplay the List of Databases screen, exit and then reenter it.</p> <p>For more information on inserting a new database, see <a href="#">Inserting a New Variable Database</a> (on page 150).</p>
U (UPDATE)	Update the description of the current database. For more information, see <a href="#">Updating Database Descriptions</a> (on page 152), and <a href="#">Updating Contents of a Database in Memory</a> (on page 164).
V (VIEW VARS)	Display the variables of the database. This option displays the Values of Database screen. For more information, see <a href="#">Displaying the Values of Databases Screen</a> (on page 154).

## List of Columns Screen

**Figure 8**      **List of Columns Screen**

[illegible]

The List of Columns screen displays the list of columns in a database. This screen can be entered by specifying a database name in the IOA Database Facility entry panel, or by specifying option S (SELECT) next to a database name in the List of Databases screen. This screen is also displayed when returning from the Column Definition screen. For a description of this screen, see [Column Definition Screen](#) (on page 149).

The column names listed on this screen represent variable names (also known as database attributes) used in the variable database. The variables listed in the Values of Database screen represent actual variable values. For a of this screen see [Displaying the Values of Databases Screen](#) (on page 154).

This screen supports up and down scrolling conventions.

## Options of the List of Columns Screen

The following options, listed at the bottom of the screen, can be applied to any row in the List of Columns screen:

**Table 68 Options of the List of Columns Screen**

Option	Description
S (SELECT)	Display and edit information about the selected column in the Variable Database screen. For more information, see <a href="#">Column Definition Screen</a> (on page 149).
I (INSERT)	Insert a new column in this variable database. For more information, see <a href="#">Inserting a New Variable Database</a> (on page 150).

## Column Definition Screen

The Column Definition screen allows you to define and order columns. This screen can be entered by selecting either option S (SELECT) in order to edit or option I (INSERT) from the List of Columns screen.

For information on displaying and editing an existing column definition, see [Displaying and Editing a Column Definition](#) (on page 149).

For information on defining a new Variable Database column, see [Defining a New Variable Database Column](#) (on page 151).

Because the column names VARNAME and VALUE in the IOAVAR database are fixed, this screen is only useful for INCONTROL products that can access multiple databases, such as Control-O.

## Displaying and Editing a Column Definition

To display and edit information for a selected column, specify option S (SELECT) next to the preceding column name in the Column Definition screen, and press Enter. The IOA Column Definition screen is displayed:

**Figure 9 Displaying Information in the IOA Column Definition Screen**

----- IOA COLUMN DEFINITION ----- (IV. S)	
COMMAND ===>	SCROLL===> CRSR
+-----+	
NAME      TSOUSER	DATABASE TUTORIAL
CREATED    /   /   -   :   :	BY      M86
COLUMN ORDER 2645134	
DESC      TSO USERID	
===== >>>>>>>> BOTTOM OF COLUMN DEFINITION <<<<<<<<< =====	
PLEASE FILL IN COLUMN DEFINITION	
16. 44. 38	

Edit any of the following fields in the Column Definition screen:

### Table 69 Fields in the Column Definition Screen

Field	Description
NAME	Column name. For display purposes only.
DATABASE	Name of database in which the column exists. For display purposes only.
CREATED	Date and time this column was created. For display purposes only.
BY	User ID that created the column. For display purposes only.
COLUMN ORDER	Number representing the column's order in the database.
DESC	Description of the column.

To exit the Column Definition screen without implementing any changes, type CAN (CANCEL) in the COMMAND line and press Enter, or press PF04/PF16.

## Inserting a New Variable Database

In the OPT field on the List of Databases Screen, enter I to insert a new variable database. The New Database window is displayed.

**Figure 10**      **New Database Window**

<b>LIST OF DATABASES -- IOA DATABASE FACILITY ----- (IV)</b>					
<b>COMMAND ==&gt;</b>	<b>+-----+</b>				<b>SR</b>
<b>OPT NAME</b>	<b> </b>	<b>SPECIFY A NAME AND DESCRIPTION FOR THE NEW DATABASE</b>			<b> </b>
I COSALLMT					
COSALLPR		NEW DATABASE NAME	CREATE	(Y/N)	
COSIMGOB					
COSIMGSD		DESCRIPTION			
COSSTCOB					
COSSTCSD		NUMBER OF ROWS 00000100			
COSVTMOB					
COSVTMSD	<b>+-----+</b>				<b>+-----+</b>
<b>===== &gt; NO MORE DATABASES &lt; =====</b>					
<b>OPTIONS: S SELECT I INSERT U UPDATE V VIEW VARS</b>					
					<b>12. 04. 36</b>

The following fields are displayed in this window:

**Table 70 Fields of the IOA Variable Database New Database Window**

Field	Description
NEW DATABASE NAME	Name of the new variable database. Up to eight characters can be specified. Mandatory.
CREATE	Whether to create the new variable database. Mandatory. Valid values are:  Y (Yes) – Create the new variable database.  N (No) – Exit the New Database window without creating the new variable database.
DESCRIPTION	Free text description of the new database. This description is displayed in the List of Databases screen. Up to 40 characters can be specified. Optional.
NUMBER OF ROWS	Maximum number of rows for the database. Mandatory. The value specified in this field is used to determine the amount of storage space allocated for the variable database.

The new database is inserted after the database for which the I (INSERT) option was specified. The list of databases is alphabetized the next time the List of Databases screen is displayed.

New Variable Databases are added to the files on disk. To make variables in a new database immediately available to Control-O rules, add the name of the new database to the DAGLBLST DD statement in the Control-O Monitor procedure, and specify the following command:

```
F CONTROLLO,LOADGLOBAL=dbname
```

where *dbname* is the name of the new database.

For more information, see Chapter [Control-O](#) (on page 551).

To populate the new database with database columns, see [Defining a New Variable Database Column](#) (on page 151).

## Defining a New Variable Database Column

To define a new column for a variable database, specify option I (INSERT) next to the preceding column name in the List of Columns screen, and press Enter.

If you are defining a new column for a variable database that has not yet been populated, specify option I next to the blank column name in the List of Columns screen.

The IOA Column Definition screen is displayed. This screen enables you to define a new column to be added to the current variable database.

```

----- IOA  COLUMN DEFINITION ----- (IV. S)
COMMAND ==>                                SCROLL==> CRSR
+-----+
| NAME      OBJECT          DATABASE COSSTCSD |
| CREATED   08/08/00 - 16:51:51  BY    N25    |
| COLUMN ORDER 0000000          |
| DESC                                             |
|===== >>>>>>>> BOTTOM OF COLUMN DEFINITION <<<<<<<<<< =====|

```

PLEASE FILL IN COLUMN DEFINITION 16. 51. 51

The following fields are displayed in the Column Definition screen.

When defining a new column, values for fields CREATED, DATABASE and BY are automatically inserted and cannot be modified in this screen.

**Table 71 Fields of the Column Definition Screen**

Field	Description
NAME	Name of the column. Up to eight characters can be specified. Mandatory.
DATABASE	Name of the variable database containing the new column.
CREATED	Date and time of column creation.
DESC	Free text description of the column. Up to 40 characters can be specified. Optional.
BY	User ID of the user who added the column.
COLUMN ORDER	Column position in the database.

To add the column, specify the necessary information and press Enter.

To exit this screen without adding a column to the variable database, specify CAN (Cancel) in the COMMAND field of this screen and press Enter.

## Updating Database Descriptions

In the OPT field on the List of Databases Screen, specify U to update the description of a variable database. The Update Database Description Window is displayed.



**Figure 12** IOA Variable Database Update Database Description Window

[illegible]

The following fields are displayed in this window:

### Table 72 Fields of the Update Database Description Window

Field	Description
DATABASE NAME	Name of the variable database. This field cannot be modified.
UPDATE	Whether to update the variable database description. Mandatory. Valid values:  Y (Yes) – Update the variable database description.  N (No) – Exit the Update Database Description window without updating the variable database description.
DESCRIPTION	New description of the variable database. Up to 40 characters can be specified.
NUMBER OF ROWS	Maximum number of rows for the database. Mandatory. The value specified in this field is used to determine the amount of storage space allocated for the variable database.

## Displaying the Values of Databases Screen

To enter this screen, type option V (VIEW VARS) in the List of Databases screen next to the database you want to display, and press **Enter**. The variables in the selected database are displayed.

**Figure 13      Control-O Values of Database Screen**

[illegible]

The Values of Database screen displays all variables in the selected database.

The column names represent attributes that describe the variable. The rows represent actual values for this variable. Variable values are loaded into memory automatically at Control-O or CMEM Monitor startup.

Standard up or down scrolling conventions are supported in this screen.

Use the scrolling PFKeys to scroll the information on the screen left (PF10/PF22) and right (PF11/PF23).



**Table 73 Fields of the IOA Values of Database Screen**

Field	Description
ROW	Each variable is assigned its own row in the database. This column displays the row number of the variable.
VARNAME	<p>The variable path and name, with the following format:  <code>%%\M\app_name\group_name\job_name\var_name</code>  where</p> <ul style="list-style-type: none"> <li>▪ <code>%%</code> – Indicates that the string is a variable. Constant. and the levels in the variable path are represented by:</li> <li>▪ <code>M</code> – Indicates that the string is a Control-M variable. Constant. Mandatory.</li> <li>▪ <code>app_name</code> – The Control-M application where <code>var_name</code> resides. Optional.</li> <li>▪ <code>group_name</code> – The Control-M group within <code>app_name</code> where <code>var_name</code> resides. Optional.</li> <li>▪ <code>job_name</code> – The Control-M job within <code>group_name</code> where <code>var_name</code> resides. Optional. and the variable name is</li> <li>▪ <code>var_name</code> – Mandatory.</li> </ul> <p>All levels in the path within the VARNAME string are separated by a \ (backslash).</p> <p>Up to 30 characters of VARNAME are displayed. If VARNAME longer, the full variable path and name can be viewed in the Variable Zoom screen, which is described in <a href="#">Variable Database Zoom Screen</a> (on page 157).</p>
VALUE	<p>Value of the variable. Up to thirty characters of the value are displayed. If the value is longer, the full value can be viewed in the Variable Zoom screen, which is described in <a href="#">Variable Database Zoom Screen</a> (on page 157).</p> <p>Note: The value of the variable may specify a character string value that contains any printable character.</p> <p>When creating an IOA Global variable using the CTMAPI utility, and blanks are needed as part of the value, they should be coded using the <code>%%BLANKnn</code> AutoEdit parameter. See the <i>Control-M for z/OS User Guide</i> for more information about the CTMAPI utility and the <code>%%BLANKnn</code> AutoEdit parameter.</p>

## Row Numbers in the Values of Database Screen

Row numbers in a variable database are initially incremented by 1000.

- When a new row is inserted, it is assigned an intermediate number incremented by 100.
- Rows inserted between row numbers with a hundreds value are assigned numbers incremented by ten.
- Rows inserted between row numbers with a tens value are assigned numbers incremented by one.

For example, a row inserted immediately after row 2000 is assigned a number of 2100.

A maximum of 999 rows can be inserted between two original rows in a variable database. Row numbers can be refreshed (that is, they can be assigned new numbers incremented by 1000) as follows:

Unload the IOA Variable Database facility's Variables file by running job IOAVARUL in the IOA JCL library. This job invokes utility IOADUL.

Reload the file by running job IOAVARLD in the IOA JCL library. This job runs utility IOADLD with parameter RENUM specified.

For more information about utilities IOADUL and IOADLD, see the *INCONTROL for z/OS Utilities Guide*.

## Options of the Values of Database Screen

The following options can be applied to any row in the Values of Database screen (Screen IV.V). Specify an option in the first (leftmost) column of the screen and press Enter.

**Table 74 Options of the Values of Database Screen**

Option	Description
Z (ZOOM)	Show each value in a row on its own line, displaying the entire content of each variable. Variables can be edited in this display as well. For more information, see <a href="#">Variable Database Zoom Screen</a> (on page 157).
I (INSERT)	Insert a new row in the database.
D (DELETE)	Delete the row for which this option is specified.
R (REPEAT)	Insert a new row that is identical to the one for which this option is specified.

## Variable Database Zoom Screen

The value of each variable can be up to 140 characters in length, but only the first eight characters of each variable value are displayed. The Variable Database Zoom screen enables display of the full variable value. To display the full variable value, specify option Z (Zoom) next to the desired row in the Display screen. The Zoom screen is displayed.

**Figure 15**      **Variable Database Zoom Screen**

```
VALUES OF DATABASE: COSALLMT ROW: 87932454 (IV. V. Z)
COMMAND ===> SCROLL===> CRSR

O NAME      VALUE
U DESIRED   UP
U CURRENT   UNKNOWN
U DESIRED
U OBJDB     COSVTMOB
U ACTCLASS
U METCLASS
U METHOD     COSMET13

===== >>>>>>>>>>>>>>>> NO MORE COLUMNS IN THIS ROW <<<<<<<<<<<<<<<< =====

OPTIONS:  A ADDITIONAL INFORMATION 08.31.07
```

The following predefined display types are available for the Variable Database Zoom screen:

**Table 75      Display Types of the Variable Database Zoom Screen**

Type	Description
D (Default display type)	Includes the first 64 characters of the value of each variable in the selected database row. A second line containing the remainder of the variable value (up to 76 characters) can be displayed using option A (Additional Information).
B (Blank Line display type)	Displays the second line for all variables, regardless of whether or not it contains additional information.

While in the Variable Database Zoom screen, the display type can be changed using the DISPLAY command. Format of the command is:

---

DI SPLAY x

where  $x$  is the identifying letter for the desired type.

DISPLAY can be abbreviated to DI.

For a list of display types, enter DISPLAY ? to show the Display Options window. To select a display type in the window, specify S (SELECT) in the Option field next to the ID. To exit the window without selecting a display type, press PF03/PF15 (END).

### Example

DI B

displays the Blank Line display type

The Default display of the Variable Database Zoom screen includes the first 64 characters of the value of each variable in the selected database row.

The following option is available in the Variable Database Zoom screen:

**Table 76 Options of the Variable Database Zoom Screen**

Option	Description
A (Additional Information)	Display a second line for the selected variable. The second line contains the remainder (up to 76 characters) of the selected variable's value.

To exit the Variable Database Zoom screen without implementing any changes specify CAN (cancel) in the COMMAND line and press ENTER.

To enable changes to a variable database loaded in memory to be immediately accessible by Control-O rules, the modified database must be reloaded by use of the following operator command:

```
F  CONTROLO,LOADGLOBAL=dbname
```

Variables in a variable database can also be updated or modified using DO SET statements in Control-O rules, or through SETOGLB statements in a KSL/KOA script. For more information, see DO SET in the parameters description chapter of the *Control-O User Guide*.

Use the following operator command to save changes made to a variable database in memory:

```
F  CONTROLO,WRITEGLOBAL=dbname
```

To exit the Variable Zoom screen without implementing any changes, type CAN (CANCEL) in the COMMAND line and press Enter.

## Loading AutoEdit Variable Databases

Use one of the following operator commands to load an AutoEdit database into memory:

- If Control-O is not installed, use

```
F  CTMCMEM,LOADGLOBAL[=dbname]
```

- If Control-O is installed, use

```
F  CONTROLO,LOADGLOBAL[=dbname]
```

where dbname indicates the databases to be loaded. Valid values:

- name - The name of a specific database to load.
- ALL - All databases listed in the concatenation referenced by DD statement DAGLBLST are loaded. If Control-O is being used, Control-O members are loaded.
- <none> - Only the default member, \$GLOBAL, is loaded.

## Updating AutoEdit Variable Databases

Use one of the following operator commands to update an AutoEdit variable database with the current status of the AutoEdit variables in memory:

- If Control-O is not installed, use

```
F CTMCMEM,WRITEGLOBAL[=dbname]
```

- If Control-O is installed, use

```
F CONTROLO,WRITEGLOBAL[=dbname]
```

where dbname indicates the databases to be updated. Valid values:

- name - Name of a specific database to be updated.
- ALL - All databases (and, if using Control-O, members) listed in the concatenation referenced by DD statement DAGLBLST are updated.
- <none> - Only member \$GLOBAL, the default member, is updated.

If command WRITEGLOBAL is used to update a database, only variables that have been modified are written to the database files, enabling more efficient use of computer resources.

## Defining a New Database

In some cases it is desirable to isolate the AutoEdit variables of certain jobs and/or rules from other jobs and rules. This can be done to enable the use of checkpoints or to perform initialization on an application basis. To isolate these variables, define a new AutoEdit variable database specifically for the AutoEdit variables you want to keep separate.

Only Control-O users can define new IOA AutoEdit variable databases. User of other INCONTROL products can access one database, called IOAVAR.

To define a new AutoEdit variable database, use the IOA Variable Database facility (as described in [Navigating and Using the IOA Variable Database Facility](#) (on page 144)), and add the name of the new database to the global member list, which is a concatenation of three members referenced by DD statement DAGLBLST: IOAGLBVL, CTOGLBVL and DAGLBLST.

The global member list is the list of members referenced by DD statement DAGLBLST of the INCONTROL product monitor procedure, which is currently either CONTROLO or CTMCMEM. DD statement DAGLBLST points to a concatenation of the following members:



**Table 77      Global Member List**

Global Member	Contents
IOAGLBVL	Contains a list of databases that are mandatory for users of all INCONTROL products, other than Control-O.
CTOGLBVL	Contains a list of databases that are mandatory for Control-O users.
DAGLBLST	Contains a list of members that are optional for Control-O users.

Each line of the global member list describes a database. The format of each line is

```
database <filetype+attribute>
```

**Table 78      Fields of Global Member List Lines**

Field	Description
<i>database</i>	Name of the database.
<i>filetype</i>	File type of global database. Valid values: DB - Standard database. S1 - XAE Type 1 database. This file type is only available for Control-O. S2 - XAE Type 2 database.

Field	Description
<i>attribute</i>	<p>Type of database. Valid values:</p> <p>INOUT - The database is loaded and updated using commands LOADGLOBAL and WRITEGLOBAL. For details, see <a href="#">Loading AutoEdit Variable Databases</a> (on page 159) and <a href="#">Updating AutoEdit Variable Databases</a> (on page 160).</p> <p>INPUT - The database can be loaded but cannot be written back. This option can be used for storing AutoEdit variables whose initial values are specified in the database and do not require checkpointing. The value of each AutoEdit variable can be changed and new AutoEdit variables can be added to the database during the INCONTROL product session, but these new values and new variables are not saved when the product is stopped. This attribute is only available for Control-O.</p> <p>PROT - The database cannot be updated during the INCONTROL product session and no new AutoEdit variables can be assigned to the database. This option can be used for a database containing AutoEdit variables that are "constants. This attribute is only available for Control-O.</p> <p>TEMP - The database does not reside on the disk and therefore cannot be loaded or written back. This attribute is useful for a database containing AutoEdit variables that do not need to be saved after the INCONTROL product session is stopped. This attribute is only available for Control-O.</p>

Below is a screen segment that contains sample content for member DAGLBLST of the Control-O PARM library.

**Figure 16 Sample Content for Member DAGLBLST**

```

Command ==>                                Scroll ==> CSR
000001 *****
000002 *      ADD LIST OF POOLS
000003 READONLY  INPUT      A READ-ONLY MEMBER
000004 * *****
000005 * *      COSMOS RELATED POOLS                                *
000006 * *****
000007 *
000008 *      DEMO DATABASES
000009 *
000010 COSWORKV  TEMP      COSMOS - WORKING VARIABLES
000011 COSALLPR  DBINPUT   COSMOS - DEMO PREREQUISITES DATABASE
000012 COSALLMT  DBINPUT   COSMOS - DEMO METHODS DATABASE
000013 COSSTCOB  SITEMP    COSMOS - DEMO STC WORKING DATABASE
000014 COSVTMOB  SITEMP    COSMOS - DEMO VTAM WORKING DATABASE
000015 COSIMG0B  DBTEMP     COSMOS - DEMO SYSIMAGE WORKING DATABASE
000016 COSSTCSD  DBINPUT   COSMOS - DEMO STC SOURCE DATABASE
000017 COSVTMSD  DBINPUT   COSMOS - DEMO VTAM SOURCE DATABASE
000018 COSIMGSD  DBINOUT   COSMOS - DEMO SYSIMAGE SOURCE DATABASE
000019 *
000020 *      PROD DATABASES
000021 *
000022 * PRDALLPR  DBINPUT   COSMOS - PROD PREREQUISITES DATABASE
000023 * PRDALLMT  DBINPUT   COSMOS - PROD METHODS DATABASE
000024 * PRDSTCOB  DBTEMP    COSMOS - PROD STC WORKING DATABASE
000025 * PRDVTMOB  DBTEMP    COSMOS - PROD VTAM WORKING DATABASE
000026 * PRDSTCSD  DBINPUT   COSMOS - PROD STC SOURCE DATABASE
000027 * PRDVTMSD  DBINPUT   COSMOS - PROD VTAM SOURCE DATABASE
000028 *
000029 * *****
000030 * *      COSMOS SAMPLE DEFINITION FOR SYSPLEX-WIDE MANAGEMENT *
000031 * *****
000032 *
000033 *      DEMO DATABASES
000034 *
000035 * COSSTCOB  SITEMP    COSMOS - DEMO STC WORKING DATABASE FOR SYSPLEX
000036 * COSVTMOB  SITEMP    COSMOS - DEMO VTAM WORKING DATABASE FOR SYSPLEX
000037 * *****
000038 * *      TUTORIAL RELATED POOLS                                *
000039 * *****
000040 TUTORIAL  DBINPUT   TUTORIAL
000041 * *****
000042 * *      XAE TEST RELATED POOLS                                *

```

```

000043 * *****
000044  XAES1D01 S1TEMP  XESXAE - DEMO - S1 - TEMP
000045 * XAES1D02 S1INPUT XESXAE - DEMO - S1 - INPUT
000046 * XAES1D03 S1PROT  XESXAE - DEMO - S1 - PROT (SAME AS DBPROT)
000047 * XAES1D04 S1INOUT XESXAE - DEMO - S1 - INOUT (SAME AS DBINOUT)
000048  XAES2D01 S2TEMP  XESXAE - DEMO - S2 - TEMP
000049  XAES2D02 S2INPUT XESXAE - DEMO - S2 - INPUT
000050 * XAES2D03 S2PROT  XESXAE - DEMO - S2 - PROT (SAME AS DBPROT)
000051 * XAES2D04 S2INOUT XESXAE - DEMO - S2 - INOUT

```

After defining and listing the new database, you must activate it with one of the following operator commands:

- If Control-O is not installed, use  
F CTMCMEM,LOADGLOBAL[=dbname]
- If Control-O is installed, use  
F CONTROLO,LOADGLOBAL[=dbname]  
where dbname is the name of the database.

## Updating Contents of a Database in Memory

To implement changes to a variable database that has already been loaded into memory, so that the changes are immediately accessible by Control-M jobs and other INCONTROL products:

### 1. Reload the modified database using one of the following operator commands:

- If Control-O is not installed, use  
F CTMCMEM,LOADGLOBAL[=dbname]
- If Control-O is installed, use  
F CONTROLO,LOADGLOBAL[=dbname]  
where *dbname* is the name of the database.

Variables in a variable database can also be updated or modified through DO SET statements in Control-M jobs, or through SETOGLB statements in a KSL/KOA script. For more information, see the DO SET parameter in the job production parameters chapter of the *Control-M for z/OS User Guide*.

### 2. Use one of the following operator commands to save changes made to the database in memory:

- If Control-O is not installed, use  
F CTMCMEM,WRITEGLOBAL[=dbname]
- If Control-O is installed, use  
F CONTROLO,WRITEGLOBAL[=dbname]  
where *dbname* is the name of the database.

Updating the IOAVAR physical database using screen IV in MODE ADMIN is hazardous in a live system!

The following discussion concentrates on the IOAVAR database which is used by Control-M, but similar problems might occur with Control-O only pools.

Updating the IOAVAR physical database using screen IV in MODE ADMIN in a live system can lead to

- variables getting lost
- blank variable names

The following scenario can lead to variables getting lost.

The IOAVAR database can be changed in the following ways:

- By Control-M SET operations (SET VAR in the Job Scheduling Definition, %%SET in the JCL) that change the live database in memory.

These changes are saved in the physical database when the WRITEGLOBAL=IOAVAR command is automatically issued.

Only a WRITEGLOBAL saves these changes to the database.

- By manually changing the physical database via screen IV in MODE ADMIN.

These manual changes are brought to the live database in memory by a LOADGLOBAL command.

A LOADGLOBAL=IOAVAR is performed automatically when Control-O/CMEM starts.

A LOADGLOBAL=IOAVAR can be issued manually when changes that are made to the physical database must be brought into the live database in memory while the system is active.

A LOADGLOBAL=IOAVAR replaces the entire existing copy of the database in memory.

It is hazardous to update the IOAVAR physical database using screen IV in MODE ADMIN in a live system and issue a LOADGLOBAL because in a live system an IOAVAR variable might be updated at any time and if the LOADGLOBAL is issued just before the WRITEGLOBAL is issued, it will cause recent changes that have not yet been saved with the WRITEGLOBAL to be wiped out.

The following scenario can lead to blank variable names:

When a variable is deleted from the database via IV screen in MODE ADMIN in a live system, and until a LOADGLOBAL=IOAVAR is issued, the variable remains in memory. If the deleted variable is added or updated by Control-M before the LOADGLOBAL=IOAVAR is issued, the variable will still be found in memory, and only the VALUE of the variable will be updated. The WRITEGLOBAL=IOAVAR writes only the value of changed or updated variables to the database (even if the value has not actually changed).

The end result will be that the physical database will include only the VALUE of the IOAVAR variable which has been deleted and updated but without its VARNAME which has been deleted. When viewed in IV screen in MODE ADMIN, blanks will appear in the VARNAME field.

## Using XAE Type Databases Instead of Standard Type Databases

The use of XAE databases enables systems in a Sysplex to access and update AutoEdit variables throughout the Sysplex. The AutoEdit variables are held in Coupling Facility structures and can be accessed by all systems connected to the Sysplex. For more information, see the AutoEdit facility chapter in the *Control-O User Guide*.

## A Comparison of XAE Databases

This topic presents three possible XAE configurations for the IOA Variable Database facility's databases

- no Sysplex
- XAE Type 1 database in a Sysplex, which is available only for Control-O
- XAE Type 2 database in a Sysplex

### No Sysplex

At sites where no Sysplex is installed, or when the database is not shared between systems in the Sysplex, only the jobs and rules on each CPU have access to the variables on that system only. There is no access between jobs and rules from one system to another. In this configuration, a standard database is sufficient.

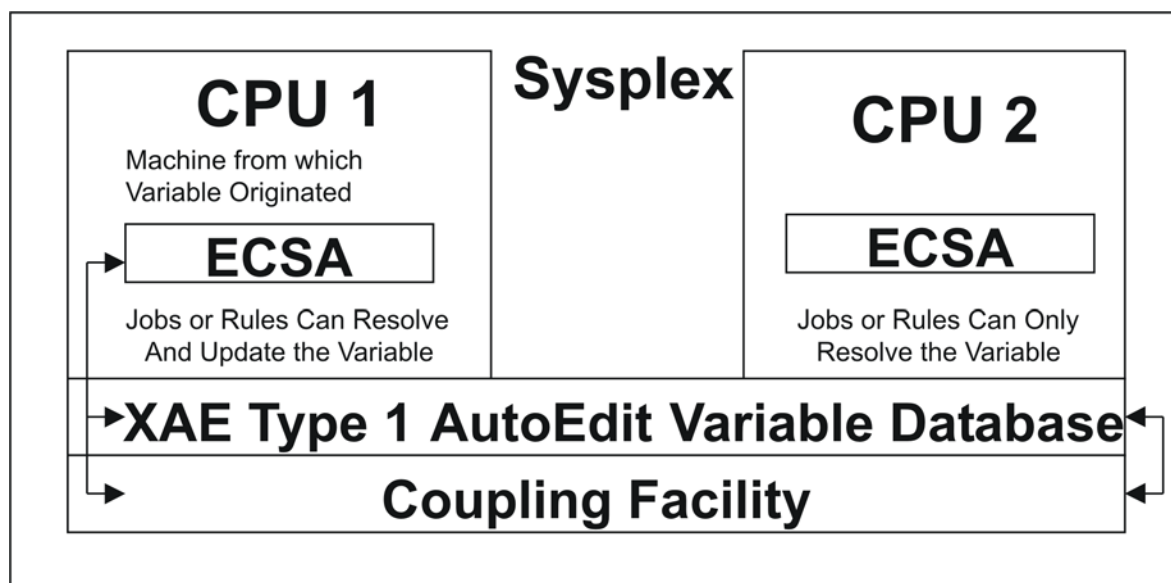
### XAE Type 1 Database in a Sysplex

At sites where a Sysplex, an XAE Type 1 database and the Coupling facility are defined

- All jobs and rules can access (resolve) all AutoEdit variables in the database, regardless of the system on which the variables were originally created.
- Only the jobs and rules on the system that originally created the AutoEdit variables can update these variables.

The following figure shows a XAE Type 1 Database in a Sysplex:

**Figure 17 XAE Type 1 Database in a Sysplex**

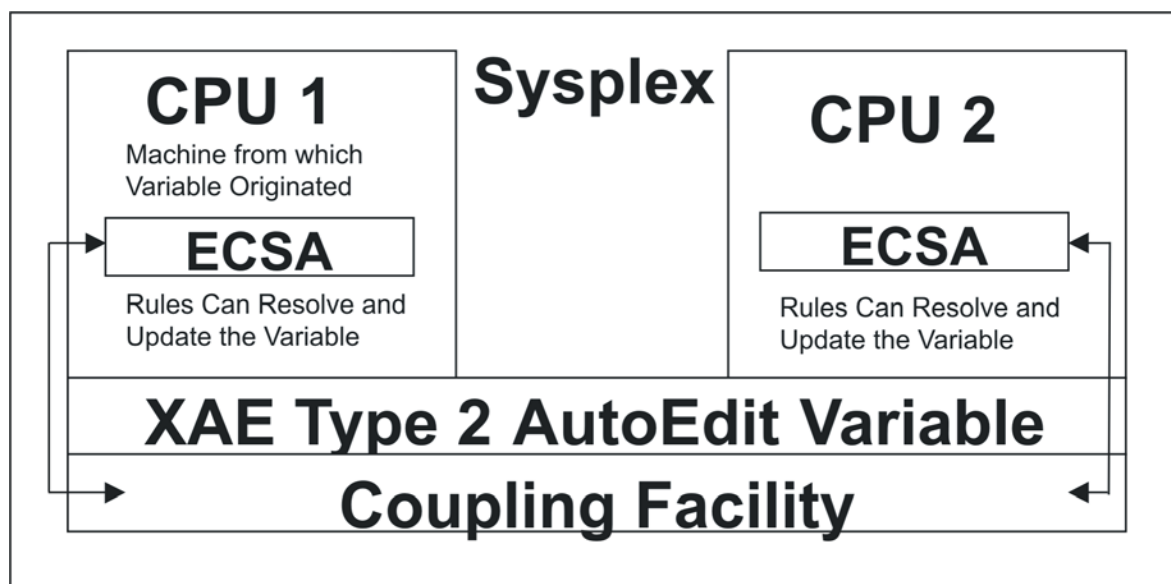


## XAE Type 2 Database in a Sysplex

At sites where a Sysplex, an XAE Type 2 database and the Coupling facility are defined, all rules and jobs can access (resolve) and update all AutoEdit variables, regardless of the system on which the AutoEdit variables were originally created.

The following figure shows a XAE Type 2 Database in a Sysplex:

**Figure 18 XAE Type 2 Database in a Sysplex**



## Performance Issues

Running the XAE facility can impact INCONTROL product performance. In some cases, the impact may be negligible. For a description of issues of impact, see [Using an XAE Type 1 Database](#) (on page 168) and [Using an XAE Type 2 Database](#) (on page 168).

Using system-managed rebuild or duplexing rebuild for the XAE structures will have the following performance impacts:

- When the structures are duplexed, each update of a variable updates both copies of the structures.
- During the system-managed rebuild or duplexing rebuild process, the structures are inaccessible. Requests to access variables will be suspended until the rebuild process ends.
- If Control-O or CMEM is started or stopped when a system-managed process is performed on its structures, Control-O or CMEM initialization or termination will be suspended until the system-managed process ends and the structures are accessible again.

## Using Standard Databases

If you use standard databases to store AutoEdit variables, the variables are stored in the Extended Common Service Area (ECSA) and are resolved based on their current values in ECSA. This option provides the best performance, but does not facilitate direct sharing of variables among Sysplex participants.

## Using an XAE Type 1 Database

If you use an XAE Type 1 database to store AutoEdit variables, the variables are stored both in the Extended Common Service Area (ECSA) and using the Coupling facility.

The advantage to this method of storing AutoEdit variables is that resolving the variables from the originating, owning, machine (from ECSA) is not costly in terms of performance.

The disadvantages to this method include the following:

- More resources are used than when using a standard AutoEdit database. This is because in addition to writing the variable contents to ECSA, the variable has to be updated in a List structure in the Coupling facility.
- Resolving variables from a machine other than the originating, owning, machine is more costly in terms of performance, because the list in the Coupling facility must be read instead of resolving the value directly from ECSA.

## Using an XAE Type 2 Database

If you use an XAE Type 2 database to store AutoEdit variables, the variables are stored both in the Common Service Area (CSA) and using the Coupling facility.

Resolving variables, regardless of from which machine, is always more expensive than with XES Type 1. This is because

- In the best case scenario, the system checks a directory-only caching mechanism implemented with a lock or cache XES structure pair to know if the ECSA copy of the variable is still valid.
- In the worst case scenario, the system must both record your interest in that variable, read the Coupling facility for the latest copy and keep that copy in ECSA).

Setting variables, regardless of from which machine, is always more costly than with XES Type 1. This is because, in addition to updating the ECSA, the system

- updates a directory-only caching mechanism implemented with a lock or cache XES structure pair, to invalidate the ECSA values stored in other computers
- updates the Coupling facility

Serializing the usage of XAE Type 2 database variables requires that you obtain both per-CPU latches and Sysplex-wide locks that can suspend and delay the execution of an address space. Make sure to avoid the excessive delay of important system address spaces.

## Calculating the Disk Space Required for the Variable Database

Installation of the IOA Variable Database is preceded by calculation steps that aid in determining the necessary space for the IO access method files.

The IOA Variable Database facility is composed of three IOA Access Method files (each of which requires two additional files, one for the data component and one for the index component, see [IOA Variable Database Facility](#) (on page 141)). Each time you add a new database in the List of Databases screen (of Screen IV) you are actually adding a new record to the Database (DBS) file. Each time you add a new column to an existing database in the List of Columns screen (of Screen IV) you are actually adding a new record to the Column (COL) file. Each time you do one of the following actions, you are actually adding a new record to the Variables (VAR) file:



- Directly add a new variable to an existing database in the display screen of Screen IV.
- Indirectly add a new variable to an existing database by executing a WRITEGLOBAL operation, for which a new value for this column/row was not previously defined.

To properly calculate the space required you either need to do one of the following:

- Estimate the average number of databases, columns and rows for the planned databases, and provide this estimate as input to the calculation steps in ICE.
- Rely on values obtained empirically from previous releases or experimentation with the facility.

## Enlarging IOA Variable Databases

There are different IOA Variable Database types; each is specified in the DAGLBLST concatenation of the Control-O or CMEM monitor. Each database type, shown in the following list, may require different kinds and amounts of resources to provide their respective functionality:

- DBINOUT
- DBINPUT
- DBPROT
- DBTEMP
- S1INOUT
- S1INPUT
- S1PROT
- S1TEMP
- S2INOUT
- S2INPUT
- S2PROT
- S2TEMP
- When allocating (or enlarging) an IOA Variable Database, you need to know which additional demand you are adding, and on which particular resources or combination of them. This is required to allocate them appropriately. Included among the resources to be considered when preparing to enlarge or allocate an IOA Variable Database are the
  - amount of ECSA needed to store the variables
  - size of the required navigation control structure to the variables
  - amount of ECSA needed for navigation control structures to the variables
  - disk space
  - coupling facility space

Each of these considerations is explained as follows:

- [Calculating the amount of ECSA needed to store the variables.](#) (on page 170)
- [Calculating the size of the required navigation control structure to the variables.](#) (on page 171)
- [Calculating disk space](#) (on page 173)
- [Calculating coupling facility space](#) (on page 173)
- [Implementing the increase in size](#) (on page 174)

## Calculating the amount of ECSA needed to store the variables.

IOA Variable databases are spreadsheet-like matrixes, where the value stored at the intersection of a specific row number and a specific column name (a slot) represents an atomic variable.

### ECSA required for a single variable

The amount of ECSA required to store a single atomic variable is 16 bytes of control information, plus the number of characters in the variable column name, plus the number of characters in the value of the variable in that column.

For example, if a variable in the MYCOL column name has 7 characters in its value, that variable will require a total of 28 bytes of ECSA. This total is computed, for purposes of this example, by adding the 16 bytes required for control information, to the 5 characters in the length of MYCOL column name string, plus the number of characters in the value of the variable in that column, which in this example is 7.

The total size of a single variable slot is limited to 256 characters. Therefore, 240 characters is the maximum that the variable name plus the variable value may occupy.

This calculation is the same for all the database types shown below:

- DBINOUT
- DBINPUT
- DBPROT
- DBTEMP
- S1INOUT
- S1INPUT
- S1PROT
- S1TEMP
- S2INOUT
- S2INPUT
- S2PROT
- S2TEMP

## ECSA required for all variables in a single IOA Variable database

You can estimate the ECSA required by a single IOA Variable database by calculating the number of columns, multiplied by the number of rows, multiplied by the average size of a variable, as explained above. To this figure, you must add a figure obtained by adding 1 to the number of columns, and multiplying that result by 256.

Note: When calculating the average size, either consider the empty slots as zero length, or do not count them in the average but multiply the (higher) average without the empty slots by a factor  $< 1$ , to represent the slot occupancy percentage.

This calculation is the same for all the database types shown below:

- DBINOUT
- DBINPUT
- DBPROT
- DBTEMP
- S1INOUT
- S1INPUT
- S1PROT
- S1TEMP
- S2INOUT
- S2INPUT
- S2PROT
- S2TEMP

## ECSA required for all variables in all IOA Variable databases

You can calculate the ECSA requirements for all variables in all IOA Variable databases simply by adding together the ECSA requirements for each individual IOA Variable database.

## Calculating the size of the required navigation control structure to the variables.

One of the attributes defined for an IOA Variable database is the NUMBER OF ROWS. The NUMBER OF ROWS is set using the =IV screen, when you add or update a new Variable IOA Database. The NUMBER OF ROWS specified for the IOA Variable Database is the primary input required to calculate the size, in ECSA, of a navigation control structure. The NUMBER OF ROWS attribute enables you to

- set a limit on the amount of rows that can be added to a database, and indicate an AutoEdit error if that limit is exceeded
- determine the ECSA space required to allocate a control structure, which helps to easily navigate the databases

This value plays the same role for all the database types shown below:

- DBINOUT
- DBINPUT
- DBPROT
- DBTEMP
- S1INOUT
- S1INPUT
- S1PROT
- S1TEMP
- S2INOUT
- S2INPUT
- S2PROT
- S2TEMP

### ECSA required for the control structure of a single IOA Variable Database

The amount of ECSA required to allocate the navigation control structure for a single IOA Variable database is determined by multiplying 16, which is the number of bytes of control information, times the number of rows defined in the database, times the number of columns defined in the database.

This allocation is the same for all the database types shown below:

- DBINOUT
- DBINPUT
- DBPROT
- DBTEMP
- S1INOUT
- S1INPUT
- S1PROT
- S1TEMP
- S2INOUT
- S2INPUT
- S2PROT
- S2TEMP

### ECSA required for the control structures of all IOA Variable Databases

You can calculate the ECSA requirements for the control structures of all IOA Variable databases simply by adding together the ECSA requirements of the control structures of each individual IOA Variable database.

## Calculating disk space

The database types listed below require disk space for the hardening of the IOA Variable Databases on disk:

- DBINOUT
- DBINPUT
- DBPROT
- S1INOUT
- S1INPUT
- S1PROT
- S2INOUT
- S2INPUT
- S2PROT

The following database types are temporary. They require only ECSA memory, and do not require disk space for the hardening of the IOA Variable Databases on disk.

- DBTEMP
- S1TEMP
- S2TEMP

When disk space is required it can be estimated using the same space calculations discussed in ICE steps 7.1, 7.2, and 7.3 of the IOA installation. The largest consumer of disk space is the Variables file, which is calculated in step 7.3.

## Calculating coupling facility space

Different database types require different space allocations. The following table outlines those requirements:

**Table 79      Coupling Facility Space Allocation Requirements**

Database Type	List Structure Space Required	Lock Structure Space Required	Cache Structure Space Required	Coupling Facility Space Required
DBINOUT	NO	NO	NO	NO
DBINPUT	NO	NO	NO	NO
DBPROT	NO	NO	NO	NO
DBTEMP	NO	NO	NO	NO
S1INOUT	YES	NO	NO	YES
S1INPUT	YES	NO	NO	YES
S1PROT	YES	NO	NO	YES
S1TEMP	YES	NO	NO	YES
S2INOUT	YES	YES	YES	YES
S2INPUT	YES	YES	YES	YES
S2PROT	YES	YES	YES	YES
S1TEMP	YES	YES	YES	YES

When coupling facility space is required it can be estimated using the same space calculations discussed in ICE step 7.7.

## Implementing the increase in size

When you increase the value of the NUMBER OF ROWS attribute you

- increase ECSA consumption
- increase the disk space consumption
- increase the coupling facility space required

## Implementing size increases when space was overallocated

However, if the disk space and coupling facility space were overallocated, it is not always necessary to re-allocate them. In such cases, it is enough to issue an `F CONTROLO,LOADGLOBAL=xxxxxx` command in all the computers, where `xxxxxx` is the name of the database whose NUMBER OF ROWS has changed.

## Implementing size increases when insufficient space was allocated

The following steps outline the procedure for implementing size increases when an insufficient amount of space was originally allocated:

1. To de-allocate the files, bring down the Control-O or CMEM monitor.
2. If more coupling facility space is required, update the CFRM policy and IOAPLEX definitions accordingly, and activate the CFRM policy. For an example of how to execute this process, see ICE steps 7.8 and 7.10. If additional coupling facility space is not required, skip this step.
3. If more disk space is required continue with the next step. Else continue with step 11.
4. Back up your IOA Variable databases.
5. Unload the databases to flat files. To do so, submit jobs IOADBSUL, IOACOLUL, and IOAVARUL from the IOAprefix.JCL library. This creates three sequential files named IOAprefix.FLAT.DBSD, IOAprefix.FLAT.COLD, and IOAprefix.FLAT.VARD respectively.
6. Rename the IOA Access Method files
7. Format the databases using jobs IOADBSBF, IOACOLBF, and IOAVARBF from ICE customization, with the newly calculated size.
8. Load the databases from the flat files using jobs IOADBSLD, IOACOLLD, and IOAVARLD from the IOAprefix.JCL library.
9. Build the indexes with jobs IOADBSBI, IOACOLBI, and IOAVARBI from the IOAprefix.JCL library.
10. Enter Screen IV from the IOA Main Menu, and verify that the databases contain the same data as before.
11. Bring up the Control-O or the CMEM monitors

## Expanding Various IOA Files

The following IOA files can be expanded using ICE:

- IOA Conditions file (CND) (For the procedure, see the IOA file customization section in the *INCONTROL for z/OS Installation Guide: Customizing*.)
- IOA Log file (LOG)
- IOA Manual Conditions file (NRS)
- IOA Database file (DBS)
- IOA Columns file (COL)
- IOA Variable file (VAR)

Perform the following the steps to expand IOA files.

For complete details about the DBS, COL, and VAR files, see [Enlarging IOA Variable Databases](#) (on page 169).

1. Close all monitors and IOA activities.

When expanding the IOA Manual Conditions file (NRS), there is no need to close any monitors or IOA activities.

When expanding the IOA Variables Database, shut down only CMEM and the Control-O monitors. However, keep in mind that when these monitors are stopped, Control-M is not able to access the AutoEdit variables in the database.

2. Rename the old file that you want to expand. If you are expanding the IOA Database, Columns, and/or Variables files, unload the following files to sequential files accordingly:
  - IOADBSUL in IOA.JCL library for the Database file.
  - IOACOLUL in IOA.JCL library for the Columns file.
  - IOAVARUL in IOA.JCL library for the Variables file.
3. Delete or Rename the old file that you want to expand. If you are expanding the IOA Variable Database facility's Columns and/or Variables files, do the following to unload these files to sequential files accordingly:
  - a. Using ICE, select Customization. Enter IOA in the Product field, select Product Customization, and then select major step 2, "Customize Dataset Parameters." Perform the minor steps in order for each file you want to expand.
  - b. Perform minor step 1, "Customization Instructions," which provides an overview of the process.
  - c. If you are expanding the IOA Log file, perform minor step 2, "IOA Log File Space Calculation."
4. Perform minor step 3, "IOA Dataset Parameters," which lets you specify values that ICE uses to calculate the appropriate file size. During this step, specify a question mark (?) in any parameter field for help.

Modify only the parameters relevant for the files you want to expand. The following table lists parameters that can be changed in this step:

**Table 80 Parameters that can be changed in this step**

Parameter	Description	Relevant File
CNDREC#	Number of records in the IOA Conditions file	Conditions file
NRSREC#	Number of records per day in the IOA Manual Conditions file	Manual Conditions file
DUALDB	Mirror Database = Y (Yes) or N (No)	Dual Conditions file

5. If you are expanding the IOA Database, Columns and Variables files, perform minor steps 4 through 6, respectively.
6. Perform minor step 7, "Save Parameters into Product Libraries," to save the parameter values that you specified in minor step 3.
7. Minor steps 8 through 14 are jobs that perform the expansion. Perform only those steps relevant to the files you want to expand.



**Table 81 File Expansion Jobs**

Files	Job	Parameter Description
Conditions file	FORMCND in the IOA INSTALL library	This job allocates and formats a new Conditions file (CND/CKP) with the new size. If the user has Control-M installed and is utilizing the Journaling feature, the Journal Conditions file must also be expanded. For details see <a href="#">Expanding Control-M Files</a> (on page 229).
Log file	FORMLOG in the IOA INSTALL library	This job allocates and formats a new Log file (LOG) with the new size.
Manual Conditions file	FORMNRS in the IOA INSTALL library	This job allocates and formats a new Manual Conditions file (NRS) with the new size.
Databases file	IOADBDBS in the IOA INSTALL library	This job allocates and formats a new Databases file (DBS) with the new size.
Columns file	IOADBCOL in the IOA INSTALL library	This job allocates and formats a new Columns file (COL) with the new size.
Variables file	IOADBVAR in the IOA INSTALL library	This job allocates and formats a new Variables file (VAR) with the new size.

8. Copy the old files into the new ones according to the instructions below:

**Table 82 Copy Methods**

Files	Copy Method
Conditions file	Copy using utility IOACCND. For information about utility IOACCND, see the <i>INCONTROL for z/OS Utilities Guide</i> .
Log file	Copy using utility IOACPLOG in the IOA JCL library. For information about utility IOACPLOG, see the <i>INCONTROL for z/OS Utilities Guide</i> .
Manual Conditions file	Run utility IOALDNRS to load the manual conditions into the new Manual Conditions (NRS) file.
Databases file	Load sequential file IOADBSLD and build index IOADBSBI into the IOA.JCL library.
Columns file	Load sequential file IOACOLLD and build index IOACOLBI into the IOA.JCL library.
Variables file	Load sequential file IOAVARLD and build index IOAVARBI into the IOA.JCL library.

9. Start the monitors and issue other relevant modify commands.

## CMEM-related maintenance

For details on maintaining (adding, deleting, or changing) the CPU list, SMFIDs, JES SIDs, and communication files, see the *INCONTROL for z/OS Installation Guide*.

## Problem determination

BMC provides a number of problem determination facilities for customer assistance. These include the following:

- [Internal Trace facility](#) (on page 178)
- [Identity Level \(IDL\) facility](#) (on page 181)
- [IOA systems comparison facilities](#) (on page 191)

### Internal Trace facility

IOA provides an internal Trace facility that can print internal tracing records and the contents of internal data areas. Under normal circumstances, the Trace facility is dormant. However, if required, that is, if BMC Customer Support has requested tracing information, the Trace facility can be activated.

Use these facilities only when requested by BMC Customer Support.

Tracing can be requested for specific components. Each component has its own identifying numbers for purposes of producing the trace. These numbers are called trace levels. One or more trace levels can be activated at the same time. Trace levels can be modified during execution.

BMC Customer Support provides you with a list of the trace levels that are used, depending on the problem encountered.

Internal tracing can be activated when the monitor is started or during monitor execution, and it can be modified or stopped during monitor execution. The internal trace setting can be displayed.

## Activating the internal Trace facility

Each INCONTROL product has its own operator commands that initiate the internal Trace facility. Some products also differentiate between which operator commands are issued, depending on whether the product's monitor is active or inactive. For information on initiating the Trace facility for an INCONTROL product, see the chapter that discusses that product.

For example, to initiate the internal Trace facility in Control-M, issue, enter the command

```
F CONTROLM,TRACE=level
```

where level is the list of trace levels to be activated or deactivated. Each INCONTROL product has different numbers of levels. For example, the Control-M Trace facility has 128 levels (that is, from 1 through 128, inclusive).

Numbers are used to activate or deactivate the trace. Positive numbers activate the trace; negative numbers deactivate the trace. Valid level values are

- any number between 1 and that product's maximum number of levels, or a range of numbers, such as 10:15, to activate the trace. The level is added to the levels already set.
- any number between -1 and the negative value of that product's maximum number of levels, or a range of numbers, such as -20:-25, to deactivate the trace. The level is removed from the active levels.

The following table gives examples of how to specify the levels that are on or off:

**Table 83 Examples of turning Trace levels on and off**

Level	Example
x	Trace level to turn on.
	Example: TRACE=3 turns on trace level 3.
-x	Trace level to turn off.
	Example: TRACE=-3 turns off trace level 3.
(x:y)	Range of trace levels to turn on, where x is the first level in the range and y is the last level in the range.
	Example: TRACE=(1:10) turns on trace levels 1 through 10.

Level	Example
(-x:-y)	Range of trace levels to turn off, where x is the first level in the range and y is the last level in the range.
	Example: TRACE=(-1:-10) turns off trace levels 1 through 10.
(x,y,z,...)	Multiple trace levels to turn on.
	Example: TRACE=(3,5,29) turns on trace levels 3, 5 and 29.
(-x,-y,-z,...)	Multiple trace levels to turn off.
	Example: TRACE=(-3,-5,-29) turns off trace levels 3, 5 and 29.

When the trace level set is completed, the following messages are displayed on the console, along with other product-specific messages (depending on the parameters specified):

```
IOAD01I TRACE LEVELS SET AS FOLLOWS:
IOAD02I 00nn:00mm - TURNED on or off
```

## Trace facility output

Tracing information is written to one or more of the following locations, depending on which trace levels were turned on:

- DD statement DATRACE of the INCONTROL product's procedure.
- DD statement DADUMP of the INCONTROL product's procedure.
- SYSDATA of the INCONTROL product's started task.

## Stopping the internal trace

When you have finished the problem determination procedures, internal tracing is stopped.

Use the following operator command to stop internal tracing in Control-M:

```
F CONTROLM,TRACE=( -1:-128 )
```

When tracing is stopped, the following messages are displayed on the console, along with any other product-specific messages:

```
IOAD01I TRACE LEVELS SET AS FOLLOWS:
IOAD02I 0001:1024 - TURNED OFF
```

## Displaying the internal Trace setting

The internal trace setting (level, DBGJOB value, and DBGPIPE value) can be displayed for a specific monitor.

Operator commands exist for each INCONTROL product for displaying the internal trace setting.

Use the following operator command to display the internal trace setting in Control-M:

---

```
F CONTROLM,TRACE=SHOW
```

---

The following messages are produced as the result of the SHOW command, along with any other product-specific messages:

---

```
IOAD03I PRESENT TRACE LEVELS ARE AS FOLLOWS:
IOAD04I level:level - on or off
IOAD04I level:level - on or off
```

---

## Identity Level (IDL) facility

The IDL facility is a diagnostic tool that can be used to determine, store, monitor, and display the maintenance level of the INCONTROL code running in an address space. This section describes:

- [IDL features](#) (on page 181)
- [Output](#) (on page 182)
- [Modify commands](#) (on page 182)
- [External tables](#) (on page 190)
- [Messages](#) (on page 191)

### IDL features

The IDL facility includes features that run automatically, and additional features that can be implemented by specific IDL modify commands.

#### Automatic features

The IDL facility automatically

- performs level identification of each CSECT of the code running in an address space
- creates level data snapshots and places them in storage at predefined checkpoints, which makes this data available the moment an address space abends
- detects level changes between snaps
- detects changes in address space configuration (list of running tasks) between subsequent snaps

## Additional features

With the IDL modify commands (See [Modify commands](#) (on page 182)), the IDL facility can be used to

- perform service functions in order to tune IDL facility behavior (see [DABAPI](#) (on page 183) and [DUP](#) (on page 183))
- change or set a default group ID (see [DEFGROUP](#) (on page 183))
- display level data of a specific module, modules, CSECT, or CSECTs (see [SHOWCSECT](#) (on page 184) and [SHOWMODULE](#) (on page 186))
- display the level data of a predefined group of modules, as listed in the IOALSUM Summary Table (see [SHOWGROUP](#) (on page 185))
- display level data (see [SHOWLEVEL](#) (on page 185))
- perform service functions useful when monitoring an address space or when finding problems (see [SHOWMEMORY](#) (on page 186))
- display a full list of tasks and modules currently running in an address space (see [SHOWMODULES](#) (on page 187))
- display modules or CSECTs that cannot be identified (see [SHOWSHORT](#) (on page 187) and [SHOWUNKNOWN](#) (on page 188))
- display level data snapshots (see [SHOWSNAP](#) (on page 188))
- create level data snapshots and place them in storage by means of a modify command (see [SNAP](#) (on page 189))

## Output

The IDL facility provides the following output features:

- DAPRIDL output – automatically sent, except in specially noted cases, into a dynamically allocated DAPRIDL DD statement.
- DABAPI output – If TRACE=499 is set at product start-up, DABAPI output will be activated and IBM Binder API diagnostic messages will be issued. (See [DABAPI](#) (on page 183))

## Modify commands

Modify commands supported by the IDL facility are issued using the following syntax:

```
F <ioagate>,IDL=<modify-command>[=<optional parameter>]
```

In this syntax

- *ioagate* – started task name
- *modify-command* – specific IDL modify command, listed alphabetically, below
- *optional parameter* – optional parameter that may be available for some of the modify commands, described below, where applicable

## DABAPI

The **DABAPI** IDL modify command enables or disables the DABAPI additional diagnostic output file. When enabled, original IBM Binder API diagnostic messages are sent to this output. The **DABAPI** IDL modify command syntax is:

```
DABAPI={ENABLE|DISABLE}
```

Shown below is an example of the output of the **DABAPI** command:

## DEFGROUP

The **DEFGROUP** IDL modify command changes or sets a new group ID of modules that were predefined in the IOALSUM Summary Table. The **DEFGROUP** IDL modify command syntax is:

```
DEFGROUP [= <group id> ]
```

Shown below is an example of the output of the **DEFGROUP** command:

```
IOAL00I IDL FACILITY RECEIVED REQUEST(DEFGROUP=IOA)
```

```
IOAL2VI DUPLICATE MODULES WILL BE IGNORED; DEFAULT GROUP ID(IOA)
```

```
IOAL0RI IDL REQUEST(DEFGROUP=IOA)                PROCESSED SUCCESSFULLY
```

## DUP

The DUP IDL modify command enables or disables handling of duplicate modules. When enabled, each instance of a module running in an address space, including those that repeat, is handled by the IDL facility. The DUP IDL modify command syntax is:

```
DUP= {HANDLE | IGNORE}
```

Shown below is an example of the output of the **DUP** command:

```
IOAL2WI HANDLING OF DUPLICATE MODULES HAS BEEN ENABLED
```

```
IOAL00I IDL FACILITY RECEIVED REQUEST(DUP=HANDLE)
```

## HELP

The **HELP** IDL modify command displays a list of IDL modify commands that are available for use. BMC recommends that you use this command as appropriate. The **HELP** IDL modify command syntax is:

```
HELP
```

Shown below is an example of the output of the **HELP** command:

```
SHOWMODULES - SHOW MAP OF THE ADDRESS SPACE
```

```
SHOWGROUP   - SHOW IDL INFO ABOUT PRE-DEFINED SUMMARY MODULES
```

```
SHOWSNAP    - SHOW CONTENTS OF THE LAST IDL SNAP
```

```
HELP        - SHOW LIST OF AVAILABLE MODIFY COMMANDS
```

```
SHOWMEMORY= - PRINT MEMORY OR MODULE INTO DATRACE
```

## REFRSUMMARY

The **REFRSUMMARY** IDL modify command dynamically refreshes the IOALSUM Summary Table. BMC recommends that you use this command as appropriate. The **REFRSUMMARY** IDL modify command syntax is:

```
REFRSUMMARY
```

Shown below is an example of the output of the **REFRSUMMARY** command:

```
IDL FACILITY RECEIVED REQUEST(REFRSUMMARY)
```

## SHOWCSECT

The **SHOWCSECT** (and WTOSECT) IDL modify commands display, in either DAPRIDL or WTO output, respectively, IDL information about a specific CSECT or multiple CSECTs[\*]. An asterisk (\*) can be used as a mask character when specifying the parameter. The command syntax of the **SHOWCSECT** and **WTOCSECT** IDL modify commands is:

```
SHOWCSECT={ <name> | <mask> }
```

```
WTOCSECT={ <name> | <mask> }
```

Shown below is an example of the output of the **SHOWCSECT** command:

```
IDL FACILITY RECEIVED REQUEST(SHOWCSECT=IOAMR*)
```

MODULE	CSECT	OFFSET	LENGTH	DATE	TIME	RELEASE	APAR	LNG
IOAMRO	IOAMRO	000000	001A92	02/17/04	14.24	6.2	BI2590	ASM

```
IDL REQUEST(SHOWCSECT=IOAMR*) PROCESSED SUCCESSFULLY, 01.80 sec CPU used;
Items:0001/0918
```

## SHOWFOREIGN

The **SHOWFOREIGN** IDL modify command displays IDL information about foreign (non-BMC) CSECTs. The **SHOWFOREIGN** IDL command syntax is:

```
SHOWFOREIGN
```

Shown below is an example of the output of the **SHOWFOREIGN** command:

MODULE	CSECT	OFFSET	LENGTH	
ECADCMPR	L\$C#TRN	004BA8	000008	Foreign belongs to SAS
ECADCMPR	L\$CARGS@	004BB0	000214	Foreign belongs to SAS
ECADCMPR	L\$CARGS+	004E68	000034	Foreign belongs to SAS

## SHOWFULL

The **SHOWFULL** IDL modify command displays full IDL information about the entire code currently running in an address space, including information about unknown, unidentified, foreign, and short CSECTs. The **SHOWFULL** IDL command syntax is:



SHOWFULL

## SHOWGROUP

The **SHOWGROUP** IDL modify command displays IDL information about a group of modules that were predefined in the IOALSUM Summary Table under the selected group ID. The default group ID is used when no group is given in the modify command, as described in the section on the [DEFGROUP \(on page 183\)](#) command. BMC recommends that you use this command as appropriate. The **SHOWGROUP** IDL command syntax is:

```
SHOWGROUP [ =<group id> ]
```

Shown below is an example of the output of the **SHOWGROUP** command:

```
IDL FACILITY RECEIVED REQUEST(SHOWGROUP=MCT)
```

```
IOAL02I GROUPID: MCT
```

MODULE	CSECT	OFFSET	LENGTH	DATE	TIME	RELEASE	APAR	LNG FROM
IOAENV	IOAENV	000000	001BD8	11/09/03	13.38	6.2	II0873	ASM (storage)
IOAMRO	IOAMRO	000000	001A92	02/17/04	14.24	6.2	BI2590	ASM
IOAMRO	H2TIMER	001A98	000346	03/21/00	13.27	6.2	IOA600	ASM
IOAPRML	IOAPRML	000000	00304A	04/20/04	21.37	6.2	II0906	ASM (library)
IOAPRML	IOAPRS	003050	001360	03/21/00	13.39	6.2	IOA600	ASM
IOALLOC	IOALLOC	000000	002578	03/30/04	17.52	6.2	II0902	ASM (library)
IOAMIO	IOAMIO	000000	000A3C	11/05/03	11.52	6.2	II0862	ASM (library)

In the rightmost column of the **SHOWGROUP** output

(*storage*) means that the IDL facility located this module in an address space

a column with no entry describes an internal CSECT

(*library*) means that the IDL facility failed to locate this module in an address space to retrieve the level information.

The IDL facility therefore has to load the information from a library and to delete later.

## SHOWLEVEL

The **SHOWLEVEL** (and **WTOLEVEL**) IDL modify commands display, in either DAPRIDL or WTO output, respectively, level information about the code currently running in an address space. BMC recommends that you use this command as appropriate. The command syntax of the **SHOWLEVEL** and **WTOLEVEL** IDL modify commands is:

```
SHOWLEVEL
```

```
WTOLEVEL
```

Shown below is an example of the output of the **SHOWLEVEL** command:

## IDL FACILITY RECEIVED REQUEST(SHOWLEVEL)

MODULE	CSECT	OFFSET	LENGTH	DATE	TIME	RELEASE	APAR	LNG
-----	-----	-----	-----	-----	-----	-----	-----	---
ECAGTW	ECAGTW	000000	002B18	04/25/04	17.27	6.2	N03	ASM
ECAGTW	CTMRSV	002B18	000300	03/21/00	13.10	6.2	IOA600	ASM
ECAGTW	CTMXAGR	002E18	000190	03/21/00	12.53	6.2	IOA600	ASM
ECAGTW	IOAT RCS	002FA8	001D99	03/21/00	14.05	6.2	IOA600	ASM
ECAGTW	IOADUMP	0053F8	00167D	11/20/00	10.16	6.2	II0610	ASM
ECAGTW	IOAHEX	006A78	000321	03/12/02	19.35	6.2	WD3399	ASM
ECALIDL	ECALIDL	000000	00021C	04/17/04	14.08	6.2	N03	ASM
ECALAST	ECALAST	000000	0031F8	01/11/04	13.13	6.2	BG0232	ASM

## SHOWMEMORY

The **SHOWMEMORY** IDL modify command prints memory, module, or control block information into DATRACE output. Default size is 256 bytes. BMC recommends that you use this command as appropriate. The **SHOWMEMORY** IDL command syntax is:

```
SHOWMEMORY= {<module>|<address>|<control block>}[, {size | FULL}]
```

Shown below is an example of the **SHOWMEMORY** command, followed by DATRACE output:

```
FACILITY RECEIVED REQUEST(SHOWMEMORY=IOAMRO)
```

DATRACE output:

```
SHOWMEMORY=IOAMRO           Address=000371D8 Size=256
000371D8 (+0000) B24000E0 18A118CF 41B00FFF 41BCB001 *  \ ~ *
000371E8 (+0010) 47F0C030 C9D6C1D4 D9D64040 60F0F261 * 0{ IOAMRO -02/*
000371F8 (+0020) F1F761F0 F460F1F4 4BF2F440 40400700 *17/04-14.24 *
00037208 (+0030) 47F0C0A0 C9D6C1D4 D9D64040 406040F0 * 0{ IOAMRO - 0*
00037218 (+0040) F261F1F7 61F0F440 F1F44BF2 F4406040 *2/17/04 14.24 - *
00037228 (+0050) C3D6D5E3 D9D6D360 C96B40D9 C5D340F6 *Control-I, REL 6*
```

The MCT and IDL control blocks are currently supported. If no size is specified for a control block identified by a keyword, its full size is printed.

You can use the ",FULL" keyword for a module. For example, you can print an entire module (subject to a 32,767 byte size limitation) if you enter the **SHOWMEMORY=<module name>,FULL** command.

## SHOWMODULE

The **SHOWMODULE** (and **WTOMODULE**) IDL modify commands display, in either DAPRIDL or WTO output, IDL information about a specific module or multiple modules. An asterisk (\*) can be used as a mask character when specifying the parameter. The **SHOWMODULE** and **WTOMODULE** IDL command syntax is:

SHOWMODULE= {<name>|<mask>}

WTOMODULE= {<name>|<mask>}

Shown below is an example of the output of the **SHOWMODULE** command:

IDL FACILITY RECEIVED REQUEST(SHOWMODULE=IOAMRO)

MODULE	CSECT	OFFSET	LENGTH	DATE	TIME	RELEASE	APAR	LNG
IOAMRO	IOAMRO	000000	001A92	02/17/04	14.24	6.2	BI2590	ASM
IOAMRO	H2TIMER	001A98	000346	03/21/00	13.27	6.2	IOA600	ASM
IOAMRO	IEANTRT	001DE0	000046	Foreign belongs to IBM				

## SHOWMODULES

The SHOWMODULES IDL modify command displays a map of an address space, that is, a full list of tasks and modules currently running in an address space. BMC recommends that you use this command as appropriate. The command syntax of the SHOWMODULES IDL modify commands is:

SHOWMODULES

Shown below is an example of the output of the SHOWMODULES command:

Address Space: A60GATED.A60GATED-GATEWAY(STC20438) System ID: OS35 OS/390 02.10

Module	TCB	CB	Owner	EPAddrss	Length	SP	Use	Attributes	Resident	AMODE	Alias
--------	-----	----	-------	----------	--------	----	-----	------------	----------	-------	-------

IEAVAR00	9FE0A8	RB*	OS2.10	879941C8	002420	252	193	Rent	L FLPA	>16	31
IEFSD060	9FFBF8	RB		80E57940	00E8C0	000	000	Rent	L PLPA		31
IEESB605	...	RB*	9FE0A8	00E68000	0049C0	000	000	Rent	L PLPA		24
ECAGTW	9F94C8	RB*	9FFBF8	00007380	01FC80	251	001		AC1 L JPA		ANY
ECALAST	...	LLE		97532A60	0035A0	251	001		AC1 L JPA	>16	31
ECAXMI	...	LLE		80034B90	001470	251	001		L JPA		31

## SHOWSHORT

The **SHOWSHORT** IDL modify command displays IDL information about of CSECTs that are too short to be identified. The command syntax of the **SHOWSHORT** IDL modify commands is:

SHOWSHORT

Shown below is an example of the output of the SHOWSHORT command:

IDL FACILITY RECEIVED REQUEST(SHOWSHORT)

MODULE	CSECT	OFFSET	LENGTH
IOADBSB#	IOADBSB#	000000	000010 Short
IOADBIB#	IOADBIB#	000000	000010 Short

## SHOWSNAP

The **SHOWSNAP** IDL modify command displays the contents of the last IDL snapshot written into storage. The command syntax of the **SHOWSNAP** IDL modify commands is:

```
SHOWSNAP
```

Shown below is an example of the output of the **SHOWSNAP** command:

```
IDL FACILITY RECEIVED REQUEST(SHOWSNAP)
```

```
IDL SNAP data created: 25/04/2004 17:32:07 Mode:DUP (or NOD)
```

```
TCB:009F94C8
```

Module	CSECT	Offset	Length	Created:timestamp	Release	APAR
ECAGTW	ECAGTW	000000	002B18	04/25/04	17.27 6.1.12	N03
ECAGTW	CTMRVS	002B18	000300	03/21/00	13.10 6.1.00	IOA600
ECAGTW	CTMXAGR	002E18	000190	03/21/00	12.53 6.1.00	IOA600
ECAGTW	IOATRC	002FA8	001D99	03/21/00	14.05 6.1.00	IOA600
ECAGTW	IOADUMP	0053F8	00167D	11/20/00	10.16 6.1.02	II0610
ECAGTW	IOAHEX	006A78	000321	03/12/02	19.35 6.1.02	WD3399
ECALAST	ECALAST	000000	0031F8	01/11/04	13.13 6.1.10	BG0232
ECALAST	CTMXAGR	0031F8	000190	03/21/00	12.53 6.1.00	IOA600

## SHOWUNIDENT

The **SHOWUNIDENT** IDL modify command displays IDL information about unidentified, but otherwise known, IDL facility CSECTs. BMC recommends that you use this command as appropriate. The command syntax of the **SHOWUNIDENT** IDL modify commands is:

```
SHOWUNIDENT
```

Shown below is an example of the output of the **SHOWUNIDENT** command:

```
IDL FACILITY RECEIVED REQUEST(SHOWUNIDENT)
```

MODULE	CSECT	OFFSET	LENGTH	
-----	-----	-----	-----	
ECAGTW	ECAEPARS	004D48	0006B0	Unidentified
ECAGTW	IOAPAR	006DA0	0009A6	Unidentified
ECADCMR	ECANCMP@	001F40	000380	Unidentified
ECADCMR	ECANCMP+	0024E8	000034	Unidentified

## SHOWUNKNOWN

The **SHOWUNKNOWN** IDL modify command displays IDL information about objects that are not defined in the table of INCONTROL prefixes, that is, CSECTs that are unknown to the IDL facility. The command syntax of the **SHOWUNKNOWN** IDL modify commands is:

## SHOWUNKNOWN

Shown below is an example of the output of the SHOWUNKNOWN command:

MODULE	CSECT	OFFSET	LENGTH	
-----	-----	-----	-----	
ECAGTW	WORKAREA	007748	000218	Unknown
ECAGTW	MODIFY	007960	000DB4	Unknown
ECAGTW	SHOWSTAT	00A5B8	0011D7	Unknown

## SNAP

The **SNAP** IDL modify command repairs and writes the IDL snapshot into memory. BMC recommends that you use this command as appropriate. The command syntax of the **SHOWUNKNOWN** IDL modify commands is:

SNAP

Shown below is an example of the output of the SNAP command:

```
IDL FACILITY RECEIVED REQUEST(SNAP)
NEW TASK(ECACMC/9A9448)   STARTED SINCE LAST IDL SNAP(17:32:07-25/04/2004)
257 kb OF IDL DATA SUCCESSFULLY SNAPPED AT(1860E000-22:58:33-25/04/2004)
014.36 sec CPU
```

## WTOCSECT

The **WTOCSECT** IDL modify command is described as part of [SHOWCSECT](#) (on page 184). An asterisk (\*) can be used as a mask character when specifying the parameter.

## WTOLEVEL

The **WTOLEVEL** IDL modify command is described as part of [SHOWLEVEL](#) (on page 185). An asterisk (\*) can be used as a mask character when specifying the parameter.

## WTOMODULE

The **WTOMODULE** IDL modify command is described as part of [SHOWMODULE](#) (on page 186). An asterisk (\*) can be used as a mask character when specifying the parameter.

## External tables

The following external tables affect IDL functionality:

- IOALIDS – Table of prefixes, owners, and identification strings that resides in a IOA load library
- IOALSUM – Source summary table that resides in a IOA IOAENV library

The IDL facility can function without reference to any other external parameters.

### IOALIDS table

The IOALIDS table of prefixes, owners, and identification strings is the main source upon which functioning of the IDL facility is based, in order to identify the running code. IOALIDS is provided as a load module that cannot be customized by a user.

The table has the following parts:

- Prefixes of the INCONTROL code
- Owners of CSECTs
- Identification strings

### IOALSUM table

The IOALSUM IOAENV source member (Summary table) contains a list of groups of modules about which level information can be issued by the **SHOWGROUP** modify command (see [SHOWGROUP](#) (on page 185)). The default group ID can be assigned by the **DEFGROUP** modify command, as shown in [DEFGROUP](#) (on page 183). If there is a need to update the table it should be copied into the IOA PARM library and changed there. The IOALSUM table can be refreshed dynamically by using the **REFRSUMMARY** modify command ([REFRSUMMARY](#) (on page 184)) without need to recycle an address space.

The following code shows an example of an IOALSUM Summary Table:

**Table 84 IOALSUM Summary Table**

SUMMARY GROUP=CTO, DISPLAY=(CTOAI DT, CTOWTO, CTOXCF, CTOAPI , CTOAODT, DFS AOEOO, I GDACSDC, I GDACSMC, I GDACSSC, DFS AOUEO)
SUMMARY GROUP=CTT, DISPLAY=(I OADBS, I OADBI , CTTDBT, CTTSYS, CTT HBLK, CTT CUP, CTTTRC)
SUMMARY GROUP=IOA, DISPLAY=(I OAENV, I OAMRO, I OAPRML, I OALLOC, I OAMI O)
SUMMARY GROUP=ECA, DISPLAY=(ECAGTW, ECAMBX, ECAAMGR, ECACOMT, ECACMRP)

Up to 28 modules can be specified in one group. The group ID is an arbitrary three-character string. At least one IOA group with a unique ID must be coded in the IOALSUM Summary table.

## Messages

The following message groups are issued by the IDL facility:

- Common informative and error messages: IOAL00I- IOAL0ZS, IOAL1ZW, IOAL2XW – IOAL2ZI, IOAL30W
- Binder API error messages: IOAL10W- IOAL1YW, IOAL31W – IOAL3HW
- Modify commands description messages: IOAL21I- IOAL2PI

For more information about these messages, see the *INCONTROL for z/OS Messages Manual*.

## IOA systems comparison facilities

BMC provides the following tools to compare members between two IOA environments to find the differences that can point to existing problems or missing corrections (PTFs):

- [xxxPARM comparison](#) (on page 191)
- [Modules level comparison](#) (on page 191)

### xxxPARM comparison

This service compares xxxPARM members of the same type to find the differences. For example, the service can be used to compare an IOA environment with an IOA production environment, or a backup library with an operational library. Specific changes can then be undone.

To run the service, do one of the following:

- From ISPF, execute command **REXX IOACMPP**
- Execute batch job **IOACMPPJ**

For more details about the IOACMPP utility, see the *INCONTROL for z/OS Utilities Guide*.

### Modules level comparison

The purpose of the service is to compare the level information of modules presented in two different IOA load data sets from two different systems. The level information is retrieved using the IDL facility. For more information, see [Identity Level \(IDL\) facility](#) (on page 181).

For more details about the IOACLVLutility, see the *INCONTROL for z/OS Utilities Guide*.

## Structure

The system consists of the following components:

- **IOACLVLG** – The job collects the level information of modules presented in an IOA load data set. It calls the IOACLVLG procedure to collect the level information of the compared load data set. The IOAGLVL, SORT, and ICETOOL programs are called by the procedure to generate the report. The output includes the module name, CSECT name, version number, APAR, IOA QNAME, and INSTID. The control variables in the job must be customized by the user. See the section about activating the utility in the description of the IOACLV utility in the *INCONTROL for z/OS Utilities Guide* for a detailed description of the control variables, and the IOACLVG job example for a sample a customized job. The job is located in the IOA SAMPLE library.
- **IOACLVLC** – The job compares the level information of modules presented in two different IOA load data sets. It calls the IOACLVLC procedure to compare the module-level information generated by the IOACLVG job on two compared systems. The SORT and ICETOOL programs are called by the procedure to generate the report. The output includes the module name, CSECT name, version number, APAR, IOA QNAME, and INSTID. The control variables part of the job must be customized by the user. See the section about activating the utility in the description of the IOACLV utility in the *INCONTROL for z/OS Utilities Guide* for a detailed description of the control variables, and the IOACVLC job example for a sample a customized job. The job is located in the IOA SAMPLE library.
- **IOAGLVL** – The program generates the level information for all modules in the STEPLIB data set and fills the temporary data set allocated to the DAPRMDF DD name with the parameters for the SORT utility that will be invoked during the following step. The program is called by the IOACLVG procedure. The output includes the module name, CSECT name, version number, APAR, IOA QNAME, and SETID. The load module of the program is located in the IOA load data set.
- **IOACLVLT** – The member contains the control statement for the ICETOOL utility that is invoked by the IOACLVG procedure, to remove duplicate entries from the output of the IOAGLVL program. The member is located in the IOA PROCLIB data set, and must not be changed by the user.
- **IOACLVLS** – The member contains the control statement for the SORT utility that is invoked by the IOACVLC procedure, to sort and merge the level information of two compared load data sets. The member is located in the IOA PROCLIB data set, and must not be changed by the user.
- **IOACLVLI** – The member contains the control statement for the ICETOOL utility that is invoked by the IOACVLC procedure, to extract the unique entries from the resulting output. The member located in the IOA PROCLIB data set, and must not be changed by the user.



# Control-M

## Overview

This chapter describes the initialization, customization, operation and administration features that are available for Control-M.

## Basic Operations

### Operator Command Quick Reference

The following is a list of some of the more common Control-M Monitor operator commands explained in this chapter.

The CTMPLEX Monitor column indicates on which monitor the operator command can be run in CTMPLEX mode. Possible values are:

- GSM - On the Global Sysplex Manager (GSM) system only.
- Both - On both the GSM and LSM systems.
- None - Not relevant to CTMPLEX. For example, CMEM has its own monitor and does not use the Control-M monitor.

**Table 85 Operator Command Quick Reference**

Category and Task	Command	CTMPLEX Monitor
<b>General Operations</b>		
<a href="#">Activating the Control-M Monitor</a> (on page 202)	S CONTROLM	Both
<a href="#">Shutting Down the Control-M Monitor</a> (on page 203)	P CONTROLM	Both
<a href="#">Modifying the Control-M Sleeping Interval</a> (on page 203)	F CONTROLM,INTERVAL= <i>xx</i>	GSM
<a href="#">Displaying Control-M Installation Parameters</a> (on page 204)	F CONTROLM,SHOWPARM	Both
<a href="#">Dynamically Refreshing Control-M Parameters</a> (on page 204)	F CONTROLM,NEWPARM	

Category and Task	Command	CTMPLEX Monitor
<a href="#">Displaying a List of Allocated Datasets</a> (on page 205)	F CONTROLM,LISTDD	Both
<a href="#">Dynamically Reloading User Exits</a> (on page 205)	F CONTROLM,RELOAD= <i>userExit</i>	GSM
Stopping Control-M monitors - <a href="#">Using STOPALL to shut down the Control-M monitor</a> (on page 205)	F CONTROLM,STOPALL	GSM
<a href="#">Writing accumulated performance data on demand</a> (on page 212)	F CONTROLM,PERFDATA=NOW	Both
<a href="#">Modifying the performance data accumulation interval</a> (on page 212)	F CONTROLM,PERFDATA= <i>nnnn</i>	Both
<b>QUIESTIME Operations</b>		
<a href="#">Setting a Planned Shutdown Time</a> (on page 206)	F CONTROLM,QUIESTIME= <i>hhmm</i>	GSM
Stopping Submission of any Job - <a href="#">Activating and Deactivating Quiesced Quantitative Resources</a> (on page 207)	F CONTROLM,QUIESTIME=NOW	GSM
Canceling previous QUIESTIME requests - <a href="#">Activating and Deactivating Quiesced Quantitative Resources</a> (on page 207)	F CONTROLM,QUIESTIME=OFF	GSM
<b>Destination Tables</b>		
<a href="#">Loading a New Dynamic Destination Table (IOADEST)</a> (on page 208)	F CONTROLM,NEWDEST= <i>member</i>	GSM
<a href="#">Refreshing the Mail Destination Table</a> (on page 208)	F CONTROLM,NEWMAILDST	GSM
<a href="#">Loading and Refreshing the SNMP Destination Table (SNMPDEST)</a> (on page 209)	F CONTROLM,NEWSNMPDST	GSM
Reloading the <a href="#">WLMSCCTL table</a> (on page 297)	F CONTROLM,NEWLMSCCTL	GSM

Category and Task	Command	CTMPLEX Monitor
<b>Deadline Scheduling and Job Network Dependencies</b>		
Refreshing DUE OUT Times - <a href="#">Refreshing Deadline Scheduling and Job Network Dependencies</a> (on page 209)	F CONTROLM,DEADLINE	GSM
Shifting the DUE OUT Time Forward - <a href="#">Shifting DUE OUT Times for Control-M Jobs</a> (on page 209)	F CONTROLM,SDOUT=+ <i>nnn</i>	GSM
Shifting the DUE OUT Time Backward - <a href="#">Shifting DUE OUT Times for Control-M Jobs</a> (on page 209)	F CONTROLM,SDOUT=- <i>nnn</i>	GSM
Refreshing PRIORITY Values <a href="#">Refreshing Deadline Scheduling and Job Network Dependencies</a> (on page 209)	F CONTROLM,PROP	GSM
Refreshing the List of Dependent Jobs in the Job Dependency Network File - <a href="#">Refreshing Deadline Scheduling and Job Network Dependencies</a> (on page 209)	F CONTROLM,NET	GSM
Simultaneously Refreshing the DEADLINE (DUE OUT) Times, PRIORITY Values and the List of Dependent Jobs in the Job Dependency Network (NET) - <a href="#">Refreshing Deadline Scheduling and Job Network Dependencies</a> (on page 209)	F CONTROLM,REFALL	GSM
<b>Security</b>		
<a href="#">Refreshing the Control-M Security Cache</a> (on page 210)	F CONTROLM,NEWSECDEF	GSM
<b>Automatic Tape Adjustment Facility</b>		
<a href="#">Refreshing the UNITDEF Table</a> (on page 228) (Unit Definition Table)	F CONTROLM,NEWUNITDEF	GSM
<b>Trace Facility</b>		
Using the Control-M Internal Trace facility - <a href="#">Problem Determination using the Internal Trace Facility</a> (on page 346)	F CONTROLM,TRACE= <i>level</i>	GSM

Category and Task	Command	CTMPLEX Monitor
<b>Supporting Interfaces</b>		
<a href="#">Switching from SAPI to PSO Support</a> (on page 210)	F CONTROLM,SAPI=NO	GSM
Switching from PSO to SAPI Support - <a href="#">Switching from SAPI to PSO Support</a> (on page 210)	F CONTROLM,SAPI=YES	GSM
<a href="#">Identity Level (IDL) facility</a> (on page 181)	F CONTROLM,IDL=< <i>IDLModifyCommand</i> >	Both
<b>AutoEdit Variables and the Cache</b>		
Reloading AutoEdit definitions to cache - <a href="#">Loading %%GLOBAL Members to Cache</a> (on page 211)	F CONTROLM,AECACHE=RELOAD	GSM
Reloading AutoEdit definitions using new list members to cache - <a href="#">Loading %%GLOBAL Members to Cache</a> (on page 211)	F CONTROLM,AECACHE=RELOAD( <i>membername</i> )	GSM
Stopping cache until AECACHE=RELOAD - <a href="#">Loading %%GLOBAL Members to Cache</a> (on page 211)	F CONTROLM,AECACHE=STOP	GSM
<b>CMEM Facility</b>		
Manually Activating the CMEM Monitor - <a href="#">Activating the CMEM Facility</a> (on page 264)	S CTMCMEM	None
Shutting Down the CMEM Facility - <a href="#">Deactivating the CMEM Facility</a> (on page 264)	F CTMCMEM,STOP Or P CTMCMEM	None
Replacing an Active CMEM Monitor - <a href="#">Replacing an Active CMEM Monitor</a> (on page 265)	S CTMCMEM	None
Replacing the Active CMEM Executor Modules - <a href="#">Replacing the Active CMEM Executor Modules</a> (on page 265)	F CTMCMEM,RELOAD= <i>module</i>	None

Category and Task	Command	CTMPLEX Monitor
Manual Loading of Rules - <a href="#">Manual Loading of Rules using Operator Commands</a> (on page 268)	F CTMCMEM,C= <i>library(table)</i>	None
Replacing All CMEM Rule Tables in All CPUs - <a href="#">Replacing All CMEM Rules Tables in All CPUs</a> (on page 269)	F CONTROLM,NEWCONLIST	None
<a href="#">Deleting (Deactivating) an Active Rule Table</a> (on page 269)	F CTMCMEM,D= <i>library(table)</i>	None
<a href="#">Displaying Active Rules</a> (on page 269)	F CTMCMEM,DISPLAY	None
<a href="#">Controlling CMEM Rule Operation Mode</a> (on page 270)	F CTMCMEM,LOG= <i>mode</i>	None
<a href="#">Modifying the CMEM Sleeping Interval</a> (on page 271)	F CTMCMEM,INTERVAL= <i>nn</i>	None
<a href="#">Refreshing the CMEM Security Cache</a> (on page 271)	F CTMCMEM,NEWSECDEF	None
<a href="#">CMEM Internal Trace</a> (on page 276)	F CTMCMEM,TRACE= <i>nn</i>	None
<a href="#">Displaying Internal Resource Utilization Statistics</a> (on page 278)	F CTMCMEM,USAGESTATS	None
<b>Journaling</b>		
<a href="#">Journal File Commands</a> (on page 356)	F CONTROLM,JOURNAL=ENABLE	GSM
<a href="#">Journal File Commands</a> (on page 356)	F CONTROLM,JOURNAL=DISABLE	GSM
<b>AJF Space Reuse Facility</b>		
Activate deletion for space reuse of jobs copied to History AJF - <a href="#">History file processing for AJF space reuse</a> (on page 234)	F CONTROLM,HISTALOC=ENABLE	GSM
Deactivate deletion for space reuse of jobs copied to History AJF - <a href="#">History file processing for AJF space reuse</a> (on page 234)	F CONTROLM,HISTALOC=DISABLE	GSM

Category and Task	Command	CTMPLEX Monitor
<b>CTMPLEX Facility</b>		
Start the Control-M monitor on any system. The monitor becomes either a GSM or LSM monitor depending on whether there are other Control-M monitors of the same CTMPLEX. - <a href="#">Controlling CTMPLEX</a> (on page 343)	S CONTROLM	GSM
Stop any LSM (when issued on the system where an LSM runs) or stop the entire CTMPLEX (when issued on the system where the GSM runs). - <a href="#">Controlling CTMPLEX</a> (on page 343)	P CONTROLM	GSM
Activates or inactivates Work Balancing mode, overriding the value of parameter BALANCEM - <a href="#">Controlling CTMPLEX</a> (on page 343)	F CONTROLM,BALANCE=YES NO	GSM
Stops all LSM monitors. The GSM monitor continues working in regular (not CTMPLEX) mode. - <a href="#">Controlling CTMPLEX</a> (on page 343)	F CONTROLM,STOPPLEX	GSM
Stops the GSM. - <a href="#">Controlling CTMPLEX</a> (on page 343)	F CONTROLM,STOPGSM	GSM
Displays information about all monitors (GSM and LSMs) of the CTMPLEX. - <a href="#">Controlling CTMPLEX</a> (on page 343)	F CONTROLM,LISTPLEX	GSM
Resumes CTMPLEX processing after environmental errors related to the CTMPLEX Coupling facility structure occur. - <a href="#">Controlling CTMPLEX</a> (on page 343)	F CONTROLM,STARTPLEX	GSM
Displays information about the GSM from an LSM - <a href="#">Controlling CTMPLEX</a> (on page 343)	F CONTROLM,WHOGLOBAL	Both

Category and Task	Command	CTMPLEX Monitor
Issues a diagnostic dump (to any of SYS1.DUMPxx datasets) in order to obtain the contents of the CTMPLEX Coupling facility structure. - <a href="#">Controlling CTMPLEX</a> (on page 343)	F CONTROLM,DUMPPLEX	GSM
<b>Newday Operations</b>		
Modify the number of intervals to wait for Newday	F CONTROLM,NEWDAYWT= <i>numberOfIntervals</i>	GSM
<a href="#">Special Newday Parameters</a> (on page 199)	F CONTROLM,NEWDAY= <i>expression</i>	GSM

## Special Newday Parameters

The Newday procedure is normally executed once daily at the time specified by the DAYTIME parameter in CTMPARM. Under certain circumstances (such as disaster recovery), you might need to execute Newday at a different time or to skip a Newday run. The NEWDAY command options described in this section enable you to accomplish such non-standard tasks.

WARNING: The *Control-M for z/OS User Guide* describes the deprecated RETRO parameter. (If a job did not run as scheduled, a value of RETRO=Y results in the job automatically running at a later time.) Even though RETRO=Y still works as designed, BMC recommends that you remove RETRO expressions from all job scheduling definitions. Doing so will also enable you to take advantage of all of the options described in the table below. If you did not remove RETRO=Y expressions from job scheduling definitions, do NOT include date parameters in special Newday commands that you run.

Special Newday commands have the following syntax:

```
F CONTROLM,NEWDAY=expression
```

where *expression* is one of the options described in the table below.

**Table 86 Newday Special Parameters**

Parameter	Description
SKIP	<p>Skip the next Newday process. Although Newday does not run at the time indicated by the DAYTIME parameter in CTMPARM, the AJF is updated as if Newday ran.</p> <p>NOTE: Under certain circumstances, the Control-M monitor initiates Newday processing immediately upon startup. To skip Newday processing at startup, start the Control-M monitor with the following command:</p> <pre>S  CONTROLM,NEWDAY=SKIP</pre> <p>The SKIP option is useful in disaster recovery scenarios in case you need to not initiate the Newday procedure upon start-up. See <a href="#">Example 1 — continue execution at recovery site</a> (on page 201). When Newday is bypassed at startup by NEWDAY=SKIP, the next upcoming Newday will run at its normal time, unless another NEWDAY=SKIP is issued.</p>
<i>hhmm</i>  NOW	<p>NOW—run Newday immediately.</p> <p><i>hhmm</i>—run Newday at the next occurrence of <i>hhmm</i>.</p> <p>If <i>hhmm</i> is earlier than the current time, the command runs NEWDAY the following day at <i>hhmm</i>. The next day's regularly scheduled Newday procedure is also executed.</p> <p>The command <code>F  CONTROLM,NEWDAY=<i>hhmm</i></code> does not change the value DAYTIME in CTMPARM.</p>
<i>hhmm</i> [, <i>date</i> ]	<p>Run Newday at time <i>hhmm</i> (or NOW). If <i>date</i> is not specified, the current ODATE is used. Otherwise, <i>date</i> determines the ODATE. According to the value of the DATETYP parameter in IOAPARM, use the appropriate of the following date formats: <i>yymmdd</i>, <i>ddmmyy</i>, <i>mmddy</i>.</p> <p>This option is useful to reschedule a workload after the computer has not been working for one or more days due to holiday, hardware failure, and so on, using the original scheduling date for each Newday iteration. See <a href="#">Example 2 — system down for three days</a> (on page 201).</p>
<i>hhmm</i> ,RERUN	<p>Rerun Newday with the current ODATE at time <i>hhmm</i> (or NOW).</p>



Parameter	Description
<i>hhmm</i> ,ORDERONLY[, <i>date</i> ]	<p>Rerun the Newday process except for the compress phase at the time specified (<i>hhmm</i>) or now, if no time is specified. If <i>date</i> is not specified, the current ODATE is used. Otherwise, <i>date</i> determines the ODATE.</p> <p>This option is useful when the job ordering phase of the Newday procedure terminated prematurely without ordering its full complement of jobs. See <a href="#">Example 4 — Newday processing abended during job ordering</a> (on page 202).</p> <p>To use this option, ensure that Enhanced Daily Checkpointing is implemented. For more information, see <a href="#">Date Control Records and Enhanced Daily Checkpointing</a> (on page 242).</p>
<i>hhmm</i> ,FORMATONLY	<p>Compress the AJF at time <i>hhmm</i> (or NOW).</p> <p>Control-M monitor enters suspend mode during this AJF compression, and resumes execution at its conclusion. There is no need to shut down Control-M monitor (which is required when you use the CTMCAJF utility COMPRESS command).</p>

## Examples

This section describes several scenarios that call for running the Newday procedure with special parameters.

### Example 1 — continue execution at recovery site

The system date at a disaster recovery site differs from the date at the production site in a way that starting Control-M monitor at the recovery site would trigger Newday processing for the wrong day. Enter the following command to start Control-M without running Newday:

---

```
S  CONTROLM,NEWDAY=SKIP
```

---

### Example 2 — system down for three days

The system was down for three days. After starting Control-M monitor according to "Example 1 — continue execution at recovery site," you probably need to run Newday for each of the three days in succession. If so, then in Control-M monitor, enter the following command three times, specifying the appropriate ODATE value for date each time (and waiting for job processing to conclude between each repetition):

---

```
F  CONTROLM,NEWDAY=NOW, date
```

---

### Example 3 — system error requires restart of Newday processing

Due to an error in JES, all of the jobs that Newday submitted ended with JCL errors. After resolving the JES issue and clearing the AJF of jobs submitted, enter the following command to rerun Newday:

```
F CONTROLM,NEWDAY=NOW,RERUN
```

### Example 4 — Newday processing abended during job ordering

If Newday processing abended during job ordering, and ODATE has not changed, enter the following command to restart job ordering:

```
F CONTROLM,NEWDAY=NOW,ORDERONLY
```

## Activating the Control-M Monitor

The Control-M monitor usually operates 24 hours a day as a started task (STC). Usually the monitor is automatically activated as part of the IPL process. To activate the monitor manually, use the operator command

```
S CONTROLM
```

If the monitor is successfully activated, the following message is displayed on the operator console:

```
CTM100I CONTROL-M MONITOR STARTED
```

When Control-M operates in standalone mode, once the Control-M monitor is active, if you try to activate an additional Control-M monitor with the same IOA components in the same computer environment where a Control-M monitor is active, the new (that is, additional) monitor immediately shuts down and an appropriate message is issued.

It is possible to activate more than one Control-M monitor in the same computer environment (for example, PROD and TEST version) by defining a different IOA environment (and a different QNAME) for each monitor. For more information see the Control-M chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

Under CTMPLEX configuration, more than one Control-M can be active under an IOA environment. For more information about Control-M in CTMPLEX configuration see [CTMPLEX: Control-M for the Sysplex](#) (on page 338).

You can issue Control-M operator commands that are executed immediately when you start the Control-M monitor. You do this by specifying the operator command in parentheses as the fourth positional operator in the START command.

Example: Activate the Control-M monitor in QUIESCE mode by issuing the following command:

```
S CONTROLM, , , (QUIESTIME=NOW)
```

No jobs will be submitted by Control-M until you issue the QUIESTIME=OFF command.

Example: Activate the Control-M monitor in QUIESCE mode and simultaneously instruct Control-M to skip the next NEWDAY process (see "Special Newday Parameters" on page 233.) by issuing the following command:

```
S CONTROLM, , , (QUIESTIME=NOW),NEWDAY=SKIP
```

No jobs will be submitted by Control-M until you issue the QUIESTIME=OFF command.

## Shutting Down the Control-M Monitor

To shut down the Control-M monitor, use the `P CONTROLM` operator command.

After a few seconds (up to a minute), the Control-M monitor shuts down and the following messages are displayed on the operator console:

```
CTM107I SHUT DOWN UPON REQUEST FROM OPERATOR
CTM120I Control-M MONITOR SHUTTING DOWN
```

In case of emergency, you can cancel the Control-M monitor. However, you should avoid doing this unless absolutely necessary, because cancelling the monitor may corrupt the database in the Active Jobs file, Conditions file, and Log file. There are times when cancelling the Control-M monitor is unavoidable (for example, when there are severe problems in JES). However, in such cases, BMC recommends that the user first try to QUIESCE Control-M, if possible. In this way, you can minimize the activity taking place within Control-M before the cancellation, and thereby minimize the potential for corruption.

When canceling the monitor, as in the case where the Control-M monitor is hung, a system (SVC) dump of the Control-M Monitor address space should be taken. To do this:

1. Enter MVS console command 'DUMP'
2. Specify JOBNAME or ASID of the monitor
3. Specify parameter SDATA=(CSA,GRSQ,SUM,RGN,TRT)

The SVC dump should be taken before trying to stop/cancel the Monitor.

When you shut down the Control-M monitor, all other Control-M facilities (for example, CMEM), IOA Online monitors, and Online facility sessions can remain active.

## Modifying the Control-M Sleeping Interval

Periodically, at a predefined interval, Control-M "wakes up" and checks what it has to do. This interval is set using a Control-M installation parameter and can be changed by the INCONTROL administrator. In addition, the sleep interval can be altered by the `F CONTROLM, INTERVAL=ss[.th]` operator command.

In this command

- *ss* is the interval in seconds
- *th* is the interval in hundredths of seconds

The interval should be modified by automatic commands invoked by the Control-M monitor itself according to set conditions and time ranges, and not manually by the operator.

At most sites, the interval should be longer during the day (when fewer batch production jobs are executing) and shorter during the night. The minimum sleep interval is 0.1 seconds.

When the modification is received by Control-M, the following message is displayed on the operator console from which the modify command was issued:

---

```
CTM123I Control-M INTERVAL IS SET TO ss.th SECONDS
```

---

## Displaying Control-M Installation Parameters

Control-M installation parameters contain general information about your system.

To display the values of some of the more important parameters, issue the following operator command:

---

```
F CONTROLM,SHOWPARM
```

---

## Dynamically Refreshing Control-M Parameters

The CTMPARM installation parameters table can be refreshed dynamically, that is, without stopping and restarting the Control-M Monitor, using the following operator command:

---

```
F CONTROLM,NEWPARM
```

---

After the command has been executed, the Control-M Monitor uses the new installation parameters from CTMPARM.

If Control-M/Restart is installed, NEWPARM also refreshes CTRPARM, and the Monitor then starts to use the new CTRPARM parameters.

Almost all Control-M and all Control-M/Restart installation parameters can be dynamically refreshed in this way. For those Control-M parameters that cannot, the original values are not replaced and the Control-M Monitor continues to use their original values. These Control-M parameters are:

- AJFSIZE
- ARMELMNT
- AUTOTAPE
- CTMPLEX
- ENHNJE
- JRNL
- MVBO
- NONSWAPM
- NEWDAYIM

To replace these values that cannot be refreshed dynamically, do the following:

1. Stop the Control-M Monitor.
2. Replace the values in the CTMPARM member.
3. Restart the Monitor.

## Displaying a List of Allocated Datasets

To display the currently allocated datasets, enter the command `F CONTROLM,LISTDD`.

The currently allocated datasets are passed to your console and to the JOBLOG of the Control-M Monitor.

## Dynamically Reloading User Exits

Control-M user exits can be dynamically reloaded without the need to recycle the Control-M Monitor by using the operator command:

```
F CONTROLM,RELOAD=userExit.
```

where *userExit* = CTMX001, CTMX002, CTMX003, CTMX004, or CTMX015.

For security purposes, some customers choose to link-edit user exit CTMX001 into load module CTMJOB or user exit CTMX002 into load module CTMSUB, or both. The RELOAD operator command will only reload these user exits if they have not been link-edited into load modules CTMJOB and CTMSUB, respectively. Before reloading these user exits, a check is made that will cause the RELOAD command to abort if these exits are link-edited directly into the aforementioned load modules.

The RELOAD command fully supports a CTMPLEX environment. All local (LSM) monitors will automatically reload the relevant user exits.

Due to the efficient way Control-M subtasks operate, the actual RELOAD of the user exits and the resulting messages, CTMR0AI and CTMR09E, may not occur until a job is ordered or a DO FORCEJOB is executed by Control-M.

## Dynamically Refreshing CTMPLEX Parameters

The System Entries parameters of the CTMPLEX parameters member can be dynamically refreshed using the following operator command:

```
F CONTROLM,NEWPLEX
```

The parameters that can be refreshed in this way are the System Entries parameters of the CTMPLEX parameters member. However, the General parameters are not processed by this command.

The General parameters of the CTMPLEX parameters member can only be refreshed by one of the following methods:

- using the STOPPLEX and STARTPLEX commands
- stopping and then restarting the Control-M Monitor

## Using STOPALL to shut down the Control-M monitor

The STOPALL command may be also used to shut down Control-M. In a non-CTMPLEX environment, this command works in the same way as the P CONTROLM operator command. In a CTMPLEX environment, this command stops all Control-M monitors (both the Global and all Locals).

To stop one or more Control-M monitors, enter the following operator command:

```
F CONTROLM,STOPALL
```

## Setting a Planned Shutdown Time

Setting the Control-M monitor planned shutdown time (QUIESTIME) stops the submission of jobs that, according to their average execution time, cannot finish before the specified QUIESTIME. Setting a QUIESTIME only affects submission processing and not other Control-M functions, such as post-processing.

QUIESTIME is set by the operator command

```
F CONTROLM,QUIESTIME=xxxx
```

In this command, *xxxx* is one of the values described in the following table:

**Table 87 QUIESTIME Values**

Value	Description
<i>hhmm</i>	Where <i>hh</i> is the hour <i>mm</i> is the minute The planned shutdown time before which, based on their execution time, jobs must end. If any jobs cannot end by that time, QUIESTIME stops their submission. A QUIESTIME command using this value supersedes any previous shutdown time setting.
NOW	Immediately stops the submission of all jobs.
OFF	Cancels any QUIESTIME requests that are currently active.
D	Displays the current status of QUIESTIME, in the form of messages CTML19I and RUNL19I. Message CTML19I appears in the IOA Log in the form CTML19I QUIESTIME IS SET: <i>yyyy</i> and message RNL19I appears in the System Log in the form RUNL19I QUIESTIME IS SET: <i>yyyy</i> where <i>yyyy</i> is <i>hhmm</i> , NOW, or OFF.

By default, QUIESTIME affects both tables and jobs. However, if the IGNQTMGR parameter in the CTMPARM member is set to Y, QUIESTIME only affects jobs.

Recycling of the Control-M monitor cancels the previously defined QUIESTIME. The QUIESTIME can be defined when the Control-M monitor is activated with the START command. For more details, see [Activating the Control-M Monitor](#) (on page 202).

## Activating and Deactivating Quiesced Quantitative Resources

When a job is ordered by Control-M, the job ordering process checks for any quantitative resources that have been deactivated or are to be deactivated at a later time. If the job requires such a quantitative resource, and if the time that the job is expected to complete is later than the time at which the quantitative resource is deactivated, then the quantitative resource is not assigned to the job, and the job will not run.

The QUIESQRES command enables users to activate and deactivate quantitative resources, and to display the status of those resources.

To display or change the status of a specific resource, enter the following command:

```
F CONTROLM,QUIESQRES=resource-name,DISPLAY|NOW|OFF|hmmm
```

where

- resource-name is the quantitative resource
- DISPLAY displays the activation status of the quantitative resource
- NOW immediately deactivates the quantitative resource
- OFF immediately reactivates the quantitative resource
- hmmm deactivates the quantitative resource at the specified time

The current status of all quiesced quantitative resources can be displayed by using an asterisk (\*) as the value of the resource-name variable, as shown in the following example:

```
F CONTROLM,QUIESQRES=*,D
```

All quiesced quantitative resources can be immediately reactivated by using an asterisk (\*) as the value of the resource-name variable, as shown in the following example:

```
F CONTROLM,QUIESQRES=*,OFF
```

You can use an asterisk as the value of the resource-name variable only with the DISPLAY and OFF subparameters.

## Shout / Mail Facility Destination Table Operations

The IOA Shout and Mail facilities allow the user to specify messages to be sent to various destinations, defined by the following tables:

- Dynamic Destination Table (IOADEST)  
Destinations in a production environment are not necessarily fixed. For example, the TSO logon ID of the shift manager is different in every shift. The Dynamic Destination table enables the user to specify a group name destination and which final destinations it represents.
- Mail Destination Table (MAILDEST)  
Mail destinations consist of names, addresses and groups to whom Control-M can send e-mail messages.

- SNMP Destination Table (SNMPDEST)

SNMP destinations consist of host names, IP addresses, nicknames, group names, and port numbers where Control-M can send SNMP traps (messages).

For instructions on how to manage these tables, see [Shout / Mail Facility Destination Table Administration](#) (on page 223).

## Loading a New Dynamic Destination Table (IOADEST)

When the Control-M monitor is started, the Dynamic Destination table, IOADEST, is loaded. To replace the Dynamic Destination table, IOADEST, with a new table, use the following operator command:

```
F CONTROLM,NEWDEST=member
```

where *member* is the name of the member with the new Dynamic Destination table.

After a few seconds, a message describing the result of the operation is displayed on the operator console from which the modify command was issued.

## Loading a New Mail Destination Table

The Mail Destination table contains a list of names, addresses, and groups to whom e-mail messages can be sent.

When the Control-M monitor is started, the Mail Destination table is loaded. Message CTM280I – MAILDEST TABLE WAS LOADED is generated when the Mail Destination table is reloaded successfully.

## Refreshing the Mail Destination Table (MAILDEST)

When a name, address or group is added or changed, the Mail Destination table must be reloaded by using the following command:

```
F CONTROLM,NEWMAILDST
```

A new Mail Destination table replaces the existing one, and the following message is displayed on the operator console from which the modify command was issued when the monitor resumes job processing:

```
CTM280I MAILDEST TABLE WAS RELOADED.
```

If the table is not found, the following message is displayed:

```
CTM281W MAILDEST TABLE WAS NOT FOUND IN ANY LIBRARY REFERENCED BY DD STATEMENT
DAPARM. UNABLE TO SEND SHOUT
```

If an error occurs while loading or reloading the table, the following message is displayed:

```
CTM288E ERROR IN PREPARING SHOUT TO MAIL, RC=rc
```



## Loading and Refreshing the SNMP Destination Table (SNMPDEST)

When the Control-M monitor is started, the SNMPDEST SNMP Destination table is loaded. The table contains host names, IP addresses, nicknames, group names, and port numbers where Control-M DO SHOUT and SHOUT WHEN can send SNMP traps (messages). When any address or name is added, changed, or deleted, the table should be reloaded with the new one by using the following command:

```
F CONTROLM,NEWSNMPDST
```

After a few seconds, a message describing the result of the operation is displayed on the operator console.

## Refreshing Deadline Scheduling and Job Network Dependencies

### Shifting DUE OUT Times for Control-M Jobs

If SHOUT WHEN LATE \* is specified in a Control-M job scheduling definition, a message is issued if the job does not finish executing by the specified DUE OUT time. A large number of such messages may be issued if Control-M is brought up after it, OS/390, or z/OS was down for a significant amount of time.

These messages can be avoided by shifting the DUE OUT time forward an appropriate amount of time (for example, if Control-M was down for two hours, shift the DUE OUT time 120 minutes forward).

To shift the DUE OUT time forward or backward, issue the command

```
F CONTROLM,SDOUT={+|-}nnn
```

where

- + and - indicate whether to shift the DUE OUT time forward (later) or backward (earlier), respectively.
- *nnn* is the number of minutes to shift the DUE OUT time. From 1 to 999 minutes can be specified.

Note: Jobs with a HELD status are not shifted by the SDOUT operator command.

The SDOUT operator command only works if the REFRESH DEADLINE IOA online command or the DEADLINE operator command (see [Refreshing Deadline Scheduling and Job Network Dependencies](#) on page 209)) was previously issued.

## Modifying number of intervals to wait for NewDay

After Control-M monitor issues the message CTM113I Control-M MONITOR <monitor name> NEWDAY PROCESSING STARTED, it waits 30 Control-M sleep intervals for the NewDay started task to start executing. If the NewDay procedure does not start to execute, a CTML03W NEW DAY PROCEDURE NOT DETECTED message is issued, followed by CTML06W REPLY 'R' FOR RESUME OR 'E' FOR END.

The number of intervals to wait is set in the CTMPARM parameter NEWDAY#W, which has a default value of 30. For example, if the Control-M sleep interval is 3 seconds, the monitor waits 90 seconds for the Newday started task to start executing.

The number of intervals can be modified by using the following operator command:

```
F CONTROLM,NEWDAYWT=<number of intervals>
```

The number of intervals must be a number containing 1 to 4 digits.

When the modification is received by Control-M, the following message is displayed on the operator console where the modify command was entered:

```
CTM109I THE NUMBER OF INTERVALS TO WAIT FOR THE CONTROL-M DAILY IS SET TO <number of intervals>
```

## Refreshing the Control-M Security Cache

Control-M security modules use a security block to identify each user for which an authority check is performed. The first time a user's security authorization is checked, Control-M creates a security block for that user. The security block can then optionally be saved for the next time the user's security authorization is checked.

Security blocks saved for subsequent checks are kept in the Control-M security cache.

The Control-M security cache holds security blocks for the last 30 users to have their security authorization checked.

Changes made to a user's security authorization (since the last time that user's security block was created) are not automatically included in the information in the user's security block in the Control-M security cache. However if a user's security authorization has been changed and there is no security block in the Control-M security cache for that user, changes made to the user's security authorization is in effect the next time that user's security authorization is checked.

To immediately include new user authorization information in the Control-M security cache, refresh the security cache using the following operator command:

---

```
F CONTROLM,NEWSECDEF
```

---

This command refreshes all user authorization information in the Control-M security cache.

## Issuing Operator Commands using a Job or Started Task

Utility IOAOPR can be used to issue operator commands from MVS, JES2, JES3, VTAM, and so on. It can be activated as a job step or as a started task, and allows full control over when to issue a command, and what to do afterwards. It is also possible to send the command to any computer (because Control-M can schedule a started task in any computer).

For a description of the IOAOPR utility, see the *INCONTROL for z/OS Utilities Guide*.

## Switching from SAPI to PSO Support

SAPI is the IBM SYSOUT processing subsystem. It is the default SYSOUT processing subsystem for Control-M when Control-M is operating under z/OS version 1.1 and later. However, Control-M continues to maintain support for PSO.

If you encounter a problem associated with job post-processing (for example, jobs not properly identified, unpredictable errors), you can switch from SAPI support to PSO support.

- To switch from SAPI support to PSO support, issue the operator command:

```
F CONTROLM,SAPI=NO
```

- To switch to SAPI support from PSO support, issue the operator command:

```
F CONTROLM,SAPI=YES
```

For more information about post-processing, see in the introduction chapter in the *Control-M for z/OS User Guide*.

## Loading %%GLOBAL Members to Cache

%%GLOBAL members can be placed in cache memory from where they can be accessed as needed. If the members are placed in cache, the JCL accesses the contents from the cache, instead of accessing the members themselves.

This can be very advantageous if many jobs access %%GLOBAL members, because each access of the member increases I/O and processing overhead. Only those %%GLOBAL members that are specifically requested are loaded to cache.

Requests are generally made by listing the desired %%GLOBAL members in a special cache list member in the DAGLOBAL library. This cache list member (default name: CACHLST) is pointed to by parameter AECACHL in member CTMPARM in the IOA PARM library.

Use the following format to list members in the cache list member:

```
%%GLOBAL memname
```

where memname is the name of the %%GLOBAL member pointed to by DD statement DAGLOBAL.

The cache list member can optionally contain the following control statement as its first non-comment statement:

```
%%RESOLVE ALLCACHE
```

This control statement affects AutoEdit processing only if an AutoEdit variable has not been resolved by searching the %%GLOBAL members identified in the job. The statement instructs Control-M to continue the variable resolution process by checking all members loaded into cache. Members in cache are searched in the same sequence they are listed in the cache list member.

%%GLOBAL members are loaded to cache:

- In the Control-M monitor's address space, at the time of Control-M startup.
- In the online address space, when the user performs AutoEdit simulations (options 2.%, 3.%, or 6.M2), or enters a JCL edit session (2.J or 3.J).

At the end of the option processing, the AutoEdit cache is deleted.

- In the batch AutoEdit simulation job.

The following commands can be used between Control-M startups, and affect only the Control-M monitor's cache processing.

To reload %%GLOBAL members to cache, specify the reload command in either of the following formats:

```
F CONTROLM,AECACHE=RELOAD
```

---

```
F CONTROLM, AECACHE=RELOAD ( membername )
```

---

Each of these formats deletes the current %%GLOBAL members from cache, and then (re)loads to cache the %%GLOBAL members listed in the cache list member.

If the command is specified without a member name, the name of the cache list member that was last loaded is used. This format is especially useful if there are changes to the list of %%GLOBAL members in the cache list member and/or changes to the contents of the currently loaded %%GLOBAL members.

If the command is specified with a member name, the member name must identify a cache list member in DAGLOBAL (other than the currently active cache list member).

To stop using AutoEdit cache, issue the following command:

---

```
F CONTROLM, AECACHE=STOP
```

---

## Accumulating performance data

Various components of Control-M collect performance related data. The accumulated data is written to SMF records. The records are written to SMF once every Newday, periodically or in response to an operator command (PERFDATA). In addition to writing the performance data to SMF records, the data is also written to the file defined by ddname DATRACE. The writing of the SMF records is accompanied by corresponding messages in the IOA trace file. For more information on the collection of performance data, see [Identity Level \(IDL\) facility](#) (on page 181).

The SMF records containing the performance data can be extracted and processed by the Control-M CTMRSMF utility. For more information on the CTMRSMF utility, - see the *INCONTROL for z/OS Utilities Guide*.

## Writing accumulated performance data on demand

To immediately write the accumulated performance data to an SMF record, use the following command:

---

```
F CONTROLM, PERFDATA=NOW
```

---

where the NOW option requests that the accumulated performance data be written immediately and a new period for accumulating performance data be started.

## Modifying the performance data accumulation interval

You can temporarily change the interval of time (expressed in minutes) between writes of an SMF record containing the accumulated performance data. This temporary change is reset to the default when the Control-M monitor is restarted. The default is specified by the PFMINT parameter in the CTMPARM member. You can change the interval using the following command:

---

```
F CONTROLM, PERFDATA=nnnn
```

---

where *nnnn* is the number of minutes between writes of an SMF record containing the accumulated performance data. Use a number from 1 to 1440.

## Basic Administrative Functions

This section discusses the following administrative issues:

- [Time Zone Support](#) (on page 213)
- [Daylight Saving Time Considerations](#) (on page 219)
- [Shout / Mail Facility Destination Table Administration](#) (on page 223)
- [Adjusting Resources](#) (on page 227)
- [Expanding Control-M Files](#) (on page 229)
- [Active Jobs File Space Reuse Facility](#) (on page 233)
- [Expanding the CMEM file configuration](#) (on page 235)
- [SYSDATA processing](#) (on page 235)
- [Accumulating Job Execution Statistics](#) (on page 235)

## Time Zone Support

### Overview

Many Control-M users have production environments spread around the world, and need to schedule jobs based on the time in a time zone other than that on their local system. Because businesses are often situated in locations very remote from each other, the work day on a particular date may span as much as 48 hours in real time.

The Time Zone feature of Control-M enables you to ensure that a job runs during the time span you require, even though the limits of that time span may be set within another time zone. By this means, you can schedule and link dependencies between jobs that must run on a specific date in one time zone with jobs that run on the same business day in another time zone, which may be very far away.

If you set the TIME ZONE parameter of the job appropriately, Control-M calculates the corresponding times automatically, and the job runs only during the hours you require.

In order to ensure backward compatibility, jobs that do not use the Time Zone feature continue to run as they always did prior to version 6.1.00. The existing concept of a working day is not affected.

As of version 6.1.00, ODATE has an enhanced definition, in which ODATE has either a VALUE or RUN attribute, which is of particular importance in relation to time zone jobs. For more information, see the discussion of date definition concepts in the introductory chapter of the *Control-M for z/OS User Guide*.

## Pre-Ordering Jobs

As a result of differences between time zones, the working day on a specific Control-M logical date can be a period of up to 48 hours, because the actual length of time between the beginning of the day on a date in the furthest East time zone and the end of that day in the furthest West time zone can reach almost 48 hours. A job in one time zone may be dependent on the outcome of another job in a different time zone. The ODATE of each job appears to the users in two different time zones to be identical, but in the absence of some adjustment to take account of the different time zones, one of the jobs may in fact run on what appears at one site to be a different work day than the work day at the site where the other job runs.

Because of this, it is necessary to pre-order jobs, in order to ensure that they run at the time the user wants.

In the case of a time zone job, the logical date is shifted to the actual date defined in the TIME\_ZONE parameter of the job, so that the logical date begins at the New Day time in the distant time zone and ends at the next New Day time in that same time zone.

The New Day procedure is executed at the New Day time at the site where Control-M is running. The New Day procedure orders all pre-ordered jobs for all time zones. However, for the Time Zone feature to operate, the Active Jobs file must contain jobs with ODATES that may start during the next 24 hours. The New Day procedure therefore orders all jobs with Time Zone parameter settings of the next working day. This ensures that those time zone jobs will be in the Active Jobs file, ready to be made eligible when the new ODATE arrives. Jobs without Time Zone parameter settings are ordered for the current ODATE as usual.

All jobs that are pre-ordered have the ODATE attribute RUN, because in all Time Zone jobs Control-M automatically treats ODATE as a RUN attribute rather than a VALUE attribute. This ensures that they do not run on the wrong date.

Time Zone jobs are pre-ordered according to the following rules:

- If a SMART Table Entity contains a Time Zone parameter setting, all jobs in the SMART Table will be pre-ordered for ODATE+1, even if they do not contain Time Zone parameter settings.
- If the SMART Table Entity does not contain a Time Zone parameter setting, no job in it will be pre-ordered for ODATE+1, even if one of the individual jobs in it contains Time Zone parameter settings.
- If a Time Zone job is not in a SMART Table, it will be pre-ordered for ODATE+1.

The activation of the pre-ordering feature is controlled by the GDFORWRD parameter in the CTMPARM member. When GDFORWRD is set to N (the default value), pre-ordering does not occur, and all jobs are ordered for ODATE, even if they are Time Zone jobs.

A user who wants to change the ODATE attribute to RUN can do so, as follows:

- When a job is ordered from the Job List Screen (Screen 2), the confirmation window contains the parameter WAIT FOR ODATE. The default setting for this parameter is N, but if the user changes this to Y, the ODATE of the job has the attribute RUN.
- When a job is ordered using the CTMJOB utility, the ODATEOPT parameter can be changed to RUN. This also changes to RUN the attribute of ODATE in the New Day procedure.

## The CLOCKnn Member

In order for the Time Zone feature to work properly, you must check the information in the CLOCK $nn$  member of the SYS1.PARMLIB library, where  $nn$  is either the number specified in the IEASYS member in SYS1.PARMLIB, or 00.

You must verify the information in the following statement:

---

```
TIMEZONE x.hh.mm.ss
```

---

where

- $x$  is either W (West of the Greenwich Meridian, that is, -GMT) or E (East, that is, +GMT)
- GMT (Greenwich Mean Time) is also known as UTC (Coordinated Universal Time).
- $hh$  are system time hours
  - $mm$  are system time minutes; valid values are either 00 or 30
  - $ss$  are system time seconds

For full information on the TIMEZONE statement, see the IBM manual *MVS Initialization and Tuning Reference*.

## Defining a Job for a Specific Time Zone

The TIME ZONE parameter appears in the Job Scheduling Definition screen (Screen 2) and the Active Environment Zoom screen (Screen 3.Z). The parameter is set using one of the 3-character codes in the TIMEZONE member in the IOA PARM library. A sample TIMEZONE member is provided, but you can edit this to suit your local site requirements. For example, you can use "EST" or "NYC" instead of "G-5" for US Eastern Standard Time.

You can also add a time zone to the predefined list. For more information, see [Adding and Modifying Time Zone Definitions](#) (on page 217).

**WARNING:** If you modify the 3-character name of a time zone in the TIMEZONE member, but fail to modify every job scheduling definition that uses that time zone in the same way, job scheduling definitions that specify that time zone become invalid. The same happens if you delete a time zone from the TIMEZONE member.

When defining Time Zone jobs, you must take into account the following special considerations:

- If you define a new Time Zone job, you must save it at least 48 hours before the first execution date. This ensures that the job is ordered automatically by the New Day procedure or the User Daily procedure, and is ordered on the date you want.

If a new Time Zone job must run on the day when you define it, order it manually, by one of the following means:

- using the CTMJOB utility
- online, using the Job Scheduling Definition screen (Screen 2)

- In addition to the Time Zone facility, you can also order a job for execution on a future date. For more information on this facility, see the description of the ODATEOPT parameter in the discussion of the CTMJOB utility in the *INCONTROL for z/OS Utilities Guide*.
- The New Day procedure orders a Time Zone job if the scheduling date of the job occurs within the next 48 hours. However, the User Daily procedure only orders jobs with scheduling criteria for the current working date. BMC therefore recommends that you arrange the jobs for each time zone in a separate table. For more information, see the following section.

## Recommended Method for Ordering Time Zone Jobs

Prior to version 6.1.00, the Active Jobs file contained only jobs that were ordered for the current working day. When the end of the working day arrived, the New Day procedure removed from the Active Jobs file all jobs with that ODATE, provided that the setting of the MAXWAIT parameter of specific jobs did not prevent such removal. Jobs so removed ceased to be eligible for submission.

As of version 6.1.00, the New Day procedure does not remove any Time Zone job from the Active Jobs file until the end of the ODATE at the Time Zone of the job, when the job is no longer eligible for submission.

With the introduction of the Time Zone feature, jobs may be pre-ordered before the ODATE specified in them, and may remain in the Active Jobs file after that ODATE.

As a result

- jobs may stay in the Active Jobs file for more than 24 hours
- the Active Jobs file may contain jobs that are to run on different ODATEs
- the Active Jobs file may consequently be much larger
- processing may consequently be slowed

This problem can be avoided by doing the following:

1. Create a separate table for each time zone that you use, and put the jobs for each time zone in the appropriate table.
2. Define a User Daily job with an order statement for each table created in step 1, as follows:
  - a. Set an AutoEdit value in one of the following ways:
    - If the site date format is MM/DD/YY:  
`//* %%SET %%DT=%%OMONTH.%%ODAY.%%OYEAR`
    - If the site date format is DD/MM/YY:  
`//* %%SET %%DT=%%ODAY.%%OMONTH.%%OYEAR`
    - For other date formats, use the appropriate combination of %%OMONTH, %%ODAY, and %%OYEAR
  - b. Set the value of ODATE to %%DT. When the User Daily job runs, this value is replaced by an appropriate date. The date depends on the setting of the GDFORWRD parameter in member CTMPARM of the IOA PARM library.
    - If GDFORWRD is set to Y, %%DT contains the date of the next day.
    - If GDFORWRD is set to N, %%DT contains the current Control-M work date.



- c. Set the ODATEOPT parameter to RUN. The ODATE value is then used to determine the working date on which the jobs run. Note that ODATEOPT can be abbreviated to ODOPT.

An example order statement:

```
ORDER DD=DALIB, MEMBER=TIMEZONE, ODATE=%%DT, ODOPT=RUN
```

The TIMEZONE member in the above example is the name of one of the tables created in step 1.

For more details on the ORDER statement, refer to the CTMJOB utility in the *INCONTROL for z/OS Utilities Guide*.

3. Modify the User Daily table, using the following parameters:

- a. Set the time zone to the appropriate value.
- b. Set the time for the User Daily job so that it runs just after the beginning of the working day in that time zone.

If you follow this procedure, jobs are ordered only when necessary, resulting in a smaller Active Jobs file and faster processing.

## Adding and Modifying Time Zone Definitions

The time zone definitions used by Control-M are kept in the TIMEZONE member in the IOA PARM library. Control-M also supports definitions for daylight saving time zones.

### Standard Time Zone Definitions

You can add a new standard time zone definition, or modify an existing definition, using the following syntax:

```
xxx = GMT+hh.mm | GMT-hh.mm
```

In the preceding syntax statement

- *xxx* is a 3-character time zone code to be used as a value for the TIME\_ZONE parameter in job scheduling definitions
- *hh* is the difference in hours between the relevant time zone and Greenwich Mean Time (GMT), expressed as a 2-figure number  
Use a leading zero if necessary.
- *mm* is the additional difference in minutes between the relevant time zone and Greenwich Mean Time (GMT), expressed as a 2-figure number

### Example

To create a new time zone definition, NYC, for New York, where the time is five hours earlier than Greenwich Mean Time (GMT), use the following syntax:

```
NYC = GMT-05.00
```

If you modify the 3-character name of a time zone in the TIMEZONE member, but fail to modify every job scheduling definition that uses that time zone in the same way, job scheduling definitions that specify that time zone become invalid. The same happens if you delete a time zone from the TIMEZONE member.

To activate changes in any time zone definition, do the following:

1. Use the NEWPARM command to refresh the time zone member used by the Control-M monitor. For information on the procedure for using the NEWPARM command, see [Dynamically Refreshing Control-M Parameters](#) (on page 204).
2. Log off TSO, and log on again.

## Daylight Saving Time Zone Definitions

You can include daylight saving time definitions when defining a time zone. To do so, define a time zone with the following statement:

```
{ LOCAL | xxx } = [ GMT+hh.mm | GMT-hh.mm ] FROM date DD.MM hh.mm TO date
DD.MM hh.mm [ GMT+hh.mm | GMT-hh.mm ]
```

In the preceding syntax statement

- LOCAL is a special time zone definition that specifies the parameter as relative to the local computer where Control-M is operating  
A LOCAL definition is needed only when specifying a daylight savings time range for the local time zone.
- *xxx*, *hh* and *mm* are the time zone code, hours, and minutes as described in [Standard Time Zone Definitions](#) (on page 217)
- In a FROM or TO clause, *date* is the *date* (the *DD.MM* or *MM.DD* depending on the installation date format DATETYP) when the clock time is changed
- In a FROM or TO clause, *hh* and *mm* are the time in hours and minutes when the clock time is changed, each expressed as a 2-figure number

In all daylight saving time zone definitions, the first time period relates to the winter zone and the second time period relates to the summer zone. A zone cannot span over the end of the calendar year (for example, you cannot define a zone that starts in November and ends in February).

The FROM keyword defines the beginning of the daylight saving time period, and the TO keyword defines the end of the daylight saving time period. The first GMT clause defines the standard (non-daylight saving time) difference between the local time and GMT, while the second GMT clause (the one after the TO clause) defines the time difference during the daylight saving period (the dates between the FROM and TO statements).

You can define a time zone without a daylight saving time zone definition. However, when you use the FROM keyword, you must then enter a full daylight saving time definition, including the TO keyword as well as the FROM keyword.

## Examples

To create a new daylight saving time zone definition, JST, for Japan, where the time is nine hours later than Greenwich Mean Time (GMT), and daylight saving time begins on March 1st at 1:59 and ends on October 24th at 2:00, use the following syntax:

```
JST = GMT+09.00 FROM 01.03 01.59 TO 24.10 02.00 GMT+10.00
```

To create a new daylight savings time zone definition for the same time zone if Control-M is operating in that time zone, use the following syntax:

```
LOCAL = GMT+09.00 FROM 01.03 01.59 TO 24.10 02.00 GMT+10.00
```

## Daylight Saving Time Considerations

In the IBM manual *MVS Setting up a Sysplex*, IBM recommends that you do not reset your time-of-day clock to switch to, or from, daylight saving time. Instead, IBM recommends that you set the time-of-day clock to Greenwich Mean Time (GMT), and use the CLOCKnn member in the PARMLIB library to adjust this time setting as appropriate for the local time at your site.

The following sections discuss adjusting the time setting forward or backward by one hour, using the CLOCKnn member, to take account of daylight saving time. All examples assume 02:00 a.m. as the time of change.

### Advancing the Clock Forward

The following examples assume that the clock is moved ahead at 2:00 a.m. (that is, 2:00 a.m. becomes 3:00 a.m.):

- [New Day Procedure](#) (on page 220)
- [Time-Dependent Shouts](#) (on page 220)
- [Time-Dependent Schedules \(FROM-UNTIL\)](#) (on page 220)
- [Cyclic Jobs](#) (on page 220)
- [IOA Log File](#) (on page 220)
- [Control-M Reports](#) (on page 220)
- [QUIESTIME](#) (on page 221)

## New Day Procedure

No special action should be taken after the clock is advanced.

- If the New Day procedure starts before you reset the clock, the New Day procedure starts working before the clock is advanced and continues normally (even if the clock is advanced while the New Day procedure is in process).
- If the New Day procedure is scheduled to begin at exactly 2:00 a.m., the same considerations apply. It is possible that the New Day procedure starts execution before the clock is manually changed. Otherwise, changing the clock initiates New Day processing.
- If the New Day procedure is scheduled to begin between 2:00 a.m. and 3:00 a.m., once the computer clock is advanced, the monitor starts the normal New Day processing.
- If the New Day procedure is scheduled to begin after 3:00 a.m., no action is required. The monitor starts the standard New Day procedure.

## Time-Dependent Shouts

- Shout messages scheduled before 2:00 a.m. do not require any action.
- Shout messages scheduled between 2:00 a.m. and 3:00 a.m. are issued, even though there may not be a delay in production since the time frame for production is smaller.
- The above also applies to jobs that have shout messages scheduled at a later time (for example, 6:00 a.m.). These jobs may be considered late because of the tighter production time frame.

## Time-Dependent Schedules (FROM-UNTIL)

Jobs whose scheduled time overlaps the time gap created by the clock shift may need manual intervention. For example, it is possible that a job with a FROM value of 2:15 a.m. and an UNTIL value of 2:45 a.m. will not be submitted at all. Adjust these jobs manually.

## Cyclic Jobs

The next run of cyclic jobs with an interval of more than one hour runs one hour sooner than it was scheduled. Cyclic jobs with an interval of less than one hour run immediately.

## IOA Log File

The IOA Log file does not contain entries with timestamps between 2:00 a.m. and 3:00 a.m. Any KSL scripts and programs that rely on log entry time must be checked for possible discrepancies due to advancing the clock.

## Control-M Reports

Certain Control-M reports (such as CTMRNSC) that depend on the IOA Log file to report on job elapsed times may show incorrect elapsed times for jobs that either started or ended (or both) in the one hour period during which the clock was moved forward.

## QUIESTIME

When the clock is moved forward, some jobs that are selected in accordance with QUIESTIME may finish later than QUIESTIME.

## Moving the Clock Backward

The following examples assume that the clock is moved back at 2:00 a.m. (that is, 2:00 a.m. becomes 1:00 a.m.):

- [New Day Procedure](#) (on page 221)
- [Time-Dependent Shouts](#) (on page 221)
- [Time-Dependent Schedules \(FROMUNTIL\)](#) (on page 222)
- [Cyclic Jobs](#) (on page 222)
- [IOA Log File](#) (on page 222)
- [Control-M Reports](#) (on page 222)
- [QUIESTIME](#) (on page 222)

## New Day Procedure

- If the New Day procedure starts before 1:00 a.m., do not take any special action. The New Day procedure runs only once.
- If the New Day procedure starts exactly at 1:00 a.m., do not adjust the CLOCK $nn$  member at 1:00 a.m., to avoid another New Day process. A second New Day procedure requires manual intervention. It is advisable to wait a few minutes (until 2:05 a.m., for example) and then adjust the CLOCK $nn$  member.
- If the New Day procedure is scheduled to begin between 1:00 a.m. and 2:00 a.m., do one of the following:
  - wait at least one full hour after the daily run begins, and then adjust the CLOCK $nn$  member (the New Day procedure will already have ended)
  - or
  - update the CLOCK $nn$  member before New Day processing begins.  
For example, if the New Day procedure is scheduled to begin at 1:45 a.m., adjust the CLOCK $nn$  member at about 1:40 a.m. If this is not done by 1:40 a.m., wait until about 2:50 a.m. and then adjust the CLOCK $nn$  member.
- If the New Day procedure is scheduled to begin after 2:00 a.m., do not take any special action.

## Time-Dependent Shouts

Shout messages scheduled between 1:00 a.m. and 2:00 a.m. may be issued twice.

## Time-Dependent Schedules (FROMUNTIL)

Do not take any special action for jobs with FROM-UNTIL schedules. Jobs scheduled to start between 1:00 a.m. and 2:00 a.m. start at the first occurrence of that hour (provided that other conditions, such as input conditions, resources, are met). However, they can be restarted after the CLOCK $nn$  member has been adjusted.

## Cyclic Jobs

The next run of cyclic jobs run one hour later than it was scheduled.

## IOA Log File

The IOA Log file may contain entries with times earlier than previous entries, due to the time shift.

## Control-M Reports

Certain Control-M reports (such as CTMRNSC) that depend on the IOA Log file to report on job elapsed times may show incorrect elapsed times for jobs that either started or ended (or both) in the one hour period during which the clock was moved backward. Some reports (such as CTMROGR) may totally omit reporting on such jobs if their apparent job end time precedes the job start time due to the clock movement.

## QUIESTIME

When the CLOCK $nn$  member is adjusted so as to "move the clock back", there may be jobs that are not selected for execution after the specified QUIESTIME, although they can finish before the QUIESTIME (because the time was added by adjusting the CLOCK $nn$  member).

## Time Zone Support

If you are using the Control-M Time Zone feature, the following matters are of particular importance:

- [Daylight Saving Time at Your Site](#) (on page 222)
- [Daylight Saving Time in the Time Zone of a Job](#) (on page 222)

### Daylight Saving Time at Your Site

For information about how to switch to or from daylight saving time at the site where Control-M is running, see [Daylight Saving Time Considerations](#) (on page 219).

In order to ensure that the Control-M Time Zone feature works as it should, you must follow the IBM recommendation. Use the TIMEZONE statement in the CLOCK $nn$  member in the PARMLIB library to adjust the time setting at your site.

### Daylight Saving Time in the Time Zone of a Job

If the time when a job must run is dependent on the local time in a Time Zone other than that at your local site, you must modify the Time Zone definitions of the job.

### Example

Assume a job must not run before the New York Stock Exchange closes. The Time Zone in this job is defined as NYC. When daylight saving time begins or ends in New York, the entry NYC in the TIMEZONE member must be modified, by adding or subtracting an hour as appropriate.

For more information on how to modify the definition of a Time Zone, see [Adding and Modifying Time Zone Definitions](#) (on page 217).

## Shout / Mail Facility Destination Table Administration

The IOA Shout (SHOUT WHEN, DO SHOUT) and Mail (DO MAIL) facilities allow the user to specify messages / e-mails to be sent to various destinations, defined by the following tables:

- **Control-M Dynamic Destination Table (IOADEST)**  
Destinations in a production environment are not necessarily fixed. For example, the TSO logon ID of the shift manager is different in every shift. The Dynamic Destination table enables the user to specify a group name destination and which final destinations it represents. For more information about setting up Dynamic Destination tables, see both [IOA Concepts and Components](#) (on page 17), and [IOA Administration](#) (on page 35).  
  
Although the Control-M Shout facility supports use of the MAILDEST table, BMC recommends that e-mails be sent using the DO MAIL facility and not the Shout facility (because of inherent limitations when using the Shout facility to send e-mail). See the *Control-M for z/OS User Guide* for information on the DO MAIL parameter.
- **Control-M Mail Destination Table (MAILDEST)**  
Mail destinations consist of names, addresses and groups to whom Control-M can send e-mail messages. The following section describes how to set up the Mail Destination table.
- **IOA SNMP Destination Table (SNMPDEST)**  
SNMP destinations consist of host names, IP addresses, nicknames, group names, and port numbers to whom Control-M can send SNMP traps (messages). For information about setting up the table, see [IOA Administration](#) (on page 35).

### Setting up the Mail Destination Table (MAILDEST)

The Mail Destination table (MAILDEST) contains a list of names, addresses and groups to whom e-mail messages can be sent. The Mail Destination table is loaded during the initialization of the Control-M monitor. It can also be loaded using operator command NEWMAILDST. For more information about loading the Mail Destination table, see [Loading a New Dynamic Destination Table \(IOADEST\)](#) (on page 208).

When modifications are made to the Mail Destination table, it must be refreshed. For more information, see [Refreshing the Mail Destination Table \(MAILDEST\)](#) (on page 208).

The options in the table are available for specifying specific addresses using Control-M DO SHOUT, SHOUT WHEN, and DO MAIL parameters (and also within the Mail Destination table itself).

**Table 88 Options for Specify Addresses**

Option	Description
Using full mail addresses	Complete addresses are specified (for example, GEORGE_SMITH@MAINCOMPANY.COM). You may want to use this option for specifying recipients that do not receive mail from you on a regular basis.
Using the default suffix	The name of the recipient is specified (for example, GEORGE_SMITH), and the default company suffix is assumed (appended to the end of the recipient name to create a complete mail address). The company suffix is stored in the Mail Destination table. You may want to use this option for internal company mail, because the company suffix is the same for all internal recipients.
Using nicknames	A short name for the recipient is specified (for example, GEORGE), whose complete name is defined in the Mail Destination table. You may want to use this option for specifying recipients to whom you send mail frequently, but do not belong to the company.

Distribution lists can also be set up in the Mail Destination table.

### Mail Destination Table Syntax

The Mail Destination table contains three sections; Global Parameters, Addresses, and Groups. The table details these sections.



**Table 89 Mail Destination Table Sections**

Parameter	Description
<p>Nicknames Section</p> <p>This section sets up "nicknames" for recipient names and their corresponding addresses. These nicknames are used as shortcuts when defining mail messages. Any number of nicknames or recipients can be defined. This feature will not function unless you specify both the NICK and the ADDR parameters.</p>	
NICK	Short name for the recipient, for example, GEORGE. Any value specified in the NICK parameter can be used as a recipient in a mail message.
ADDR	Full e-mail address of recipient, for example, GEORGE_SMITH@MAINCOMPANY.COM.
<p>Groups Section</p> <p>This section facilitates the creation of groups of addresses, for use as distribution lists. Any number of groups or distribution lists can be defined. The addresses for a group or distribution list can be specified, by means of</p> <p>a recipient name, which is automatically followed by the default suffix (defined by the DFLTSFFX parameter in the MAIL section of the IOAPARM member)</p> <p>the ADDR parameter, specifying the full address</p> <p>the NICK parameter, using the nickname</p>	
GROUP	Name of the group or distribution list.
TOADDR	Full e-mail address of recipient, for example, GEORGE_SMITH@MAINCOMPANY.COM.
CCADDR	Full e-mail address of person to CC, for example, MARY_JONES@MAINCOMPANY.COM.
TOMAIL	Name of recipient (to which is appended the default mail suffix, as defined by the DFLTSFFX parameter in the MAIL section of the IOAPARM member) for example, GEORGE_SMITH.
CCMAIL	Name of person to CC (to which is appended the company mail suffix, as defined by the DFLTSFFX parameter in the MAIL section of the IOAPARM member) for example, MARY_JONES.
TONICK	Name of recipient, as specified in the Addresses section by nickname, for example, GEORGE.
CCNICK	Name of person to CC, as specified in the Addresses section by nickname, for example, MARY.

## Creating the Mail Destination Table

A sample Mail Destination table is provided in member MAILDEMO of the IOA PARM library. Change the member name to MAILDEST after modifying it, leaving the original member MAILDEMO intact.

## Examples

The DO MAIL statements, shown in the following example, are valid based on the contents of the sample mail destination table shown below:

**Figure 19 DO MAIL Example**

```
ON PGMST ANYSTEP PROCST          CODES OK
DO MAIL
TO  EVERYBODY
CC  BMC_STAFF
    EXTERNAL_RECIPE
SUBJ JOB FINISHED O.K
TEXT Continue processing
```

**Figure 20 Sample Mail Destination Table**

```
*-----*
*          DEFINITION OF ALL ' NICKNAME' ADDRESSES          *
*-----*
NICK=GEORGE
  ADDR=GEORGE_SMITH@MAINCOMPANY.COM
NICK=MARY
  ADDR=MARY_JONES@MAINCOMPANY.COM
NICK=MARTA
  ADDR=MARTA_GONZALEZ@BIGCOMPANY.COM
*-----*
*          DEFINITION OF ALL ' NICKNAME' GROUPS              *
*-----*
GROUP=EVERYBODY
  TOADDR=JOEL@BIGCOMPANY.COM
  CCADDR=PIERRE@COMPANY.COM
  TOMAIL=ROBERT
  TOMAIL=LESLIE
  TONICK=GEORGE
  TONICK=MARY
  CCMAIL=DAVID
  CCNICK=MARTA
GROUP=BMC_STAFF
  TOMAIL=ROBERT
  TOMAIL=LESLIE
  CCMAIL=DAVID
GROUP=EXTERNAL_RECIPE
  TOADDR=JOEL@BIGCOMPANY.COM
  CCADDR=PIERRE@COMPANY.COM
  TONICK=GEORGE
  TONICK=MARY
  CCNICK=MARTA
***** Bottom of Data *****
```

## Adjusting Resources

### Adjusting Resource Acquisition in the Scheduling Algorithm

Control-M enables the user to modify the Control-M scheduling algorithm using Control-M User Exit CTMX004. The user can assign weight (importance) to quantitative resources, such as tapes, CPU, and so on. This exit is loaded when the Control-M monitor is started. To replace the current exit with a new one, with a new set of weights, use the following operator command:

---

```
F CONTROLM,RELOAD=CTMX004
```

---

### Using the Automatic Tape Adjustment Facility

The Automatic Tape Resource Adjustment facility optimizes usage of tape or cartridge drives during production batch processing. This facility makes modifications automatically (as opposed to prior versions, in which the user had to manually modify the job definition as necessary). This facility enables Control-M tape drive resources to be automatically assigned (overriding tape drive resource allocations specified in the RESOURCE parameter of the job scheduling definition).

The Automatic Tape resource Adjustment facility can make the modifications automatically because it tracks usage statistics for each tape resource as it is used.

To implement the Automatic Tape Adjustment facility, perform the following steps:

1. Set the AUTOTAPE parameter to Y (Yes) during Control-M customization in the INCONTROL Installation and Customization Engine (ICE).
2. Modify the UNITDEF member in the Control-M PARM library to specify the device numbers of all drives that the facility must control. The format of the definitions is

---

```
devi cetype={ ( ) from- to{ , from2- to2, . . . } , DESC=descri pti on
```

---

The following table describes the parameters in this command:

**Table 90 UNITDEF Parameters**

Parameter	Description and Values
<i>devicetype</i>	<p>Type of device being defined. A device type is the set of all drives of the same type. Each tape drive type must be named. The name can be a maximum of 20 characters long, and must not contain embedded blanks. A maximum of 12 tape drive types can be defined.</p> <p>For example, all 3420 tape drives can be named TAPE, and all 3490 cartridges can be called CART.</p> <p>Warning: The order of the device types in the UNITDEF member must not be changed. Old, obsolete device types should not be deleted, and new device types should only be added at the end of the member.</p>
<i>from-to</i>	<p>Unit address ranges for each device. The unit address ranges are specified as a series of pairs, the first of which is the starting address and the second of which is the ending address of the device. All addresses must be specified in 4 digits (for example, 0460 and not 460).</p> <p>If one tape drive type consists of more than one unit address range, additional ranges can be specified, separated by commas and enclosed in parentheses.</p>
<i>description</i>	Descriptive text for the device being defined.

**Example**

```

*****
TAPE=0460-046F, DESC=UNITS FOR EXTERNAL TAPES
CARTRIDGE=(0480-0483, 0440-0445, 0300-031F, 0552-0553, 0554-0555,
0556-0557), DESC=3490 RANGE
*****

```

3. Shut down and restart the Control-M monitor.
4. Exit the IOA online environment and reenter the IOA online environment.

For more information about the turning on the Automatic Tape Adjustment facility, see the chapter on customizing INCONTROL products in the *INCONTROL for z/OS Installation Guide: Customizing*.

## Refreshing the UNITDEF Table

To refresh the Unit Definition (UNITDEF) table, issue the following operator command:

```
F CONTROLM,NEWUNITDEF
```

## Quiescing Quantitative Resources

Quantitative resources can be assigned to jobs at any time, as long as they are available. The QUIESQRES command enables users to activate and deactivate quantitative resources for a defined time, and to display the status of those resources. For further information see [Activating and Deactivating Quiesced Quantitative Resources](#) (on page 207).

## Expanding Control-M Files

The following Control-M files can be expanded using the Installation and Customization Engine (ICE):

- Resources file (RES)
- Jobs Dependency Network file (GRF)
- Statistics file (STAT)
- Dual Active Jobs file
- History Jobs file
- Journaling file
- Journaling conditions file
- Active Jobs file (AJF) (For the procedure, see the Control-M file customization section in the *INCONTROL for z/OS Installation Guide: Customizing*.)

Perform the following steps to expand Control-M files:

1. Close all monitors and IOA activities. For example, to shut down the Control-M monitor, issue operator command P CONTROLM.
2. Rename the old file (that you want to expand).
3. Using ICE, select Customization. Enter CTM in the Product field, select Product Customization, and then select major step 2, "Customize Dataset Parameters." Perform the minor steps in order for each file you want to expand.
4. Perform minor step 1, "Customization Instructions," which provides an overview of the process.
5. Perform minor step 2, "Control-M Dataset Parameters," which lets you specify values for ICE to use to calculate the appropriate file size. During this step, specify a question mark (?) in any parameter field for help.

Modify only the parameters relevant for the files you want to expand. The following parameters can be changed using this step:

**Table 91 Parameters for Expanding Various Control-M File**

Parameter	Description	Relevant Files
AJFSIZE	Number of records in Active Jobs File	Active Jobs file, Dual Active Jobs file, and AJF for Journaling
CNDREC#	Number of records in the Journaling Conditions file	Condition file for Journaling
	Note: This is the same parameter that controls the number of records in the IOA Conditions file.	
RESBQNT#	Max # of different resources defined	Resources file
RESQNT#	# of records for QUANTITATIVE resources	Resources file
RESCNTL#	# of records for Control resources	Resources file
HSTSIZE	Number of records in History AJF	History Jobs file
JNLPSIZ	Primary space (cyl) for journaling file	journaling file
JNLSSIZ	Second. space (cyl) for journaling file	journaling file
GRFSIZE	Space (cyl) for GRF file	Jobs Dependency Network file
STTPSIZ	Primary space (cyl) for Statistics file	Statistics file
STTSSIZ	Secondary pace (cyl) for Statistics file	Statistics file

6. Perform minor step 3, "Save Parameters into Product Libraries," to save the parameter values that you specified in minor step 2.
7. Minor steps 4 through 10 are jobs that perform the expansion. Perform only those steps relevant to the files you want to expand.

**Table 92 Jobs for Expanding Various Control-M Files**

Job	Files	Job Description
FORMCKP in the Control-M INSTALL library	Active Jobs file and Dual Active Jobs file	This job allocates and formats a new Active Jobs file (AJF) with the new size. If the journaling feature is being utilized, you must also expand the AJF for Journaling file.
FORMGRF in the Control-M INSTALL library	Jobs Dependency Network file	This job allocates and formats a new Jobs Dependency Network (GRF) file with the new size.
FORMHST in the Control-M INSTALL library	History Jobs file	This job allocates and formats a new History Jobs file (HST) with the new size.
FORMJAJF in the Control-M INSTALL library	AJF for Journaling file	This job allocates and formats a new AJF for Journaling file with the new size.
FORMJCND in the Control-M INSTALL library	Conditions file for Journaling	This job allocates and formats a new Conditions file for Journaling with the new size.
FORMJRES in the Control-M INSTALL library	Resources file for Journaling	This job allocates and formats a new Resource file for Journaling with the new size.
FORMJRNL in the Control-M INSTALL library	Journaling file	This job allocates and formats a new journaling file with the new size.
FORMRES in the Control-M INSTALL library	Resources file	This job allocates and formats a new Resources file (RES) with the new size.

Job	Files	Job Description
FORMSTT in the Control-M INSTALL library	Statistics file	<p>This job allocates and formats a new Statistics (STAT) file with the new size.</p> <p>If it is anticipated that the Statistics file will grow to be very large (over 4G bytes) then the STATFILE should be defined with Extended Addressability capability.</p> <p>Extended format data sets are system-managed and the mechanism for requesting extended format is through the SMS data class DSNTYPE=EXT parameter and subparameters R (required) or P (preferred). The storage administrator can specify R to ensure the data set is extended. The storage administrator must also set the extended addressability attribute to Y to request extended addressability. See the <i>IBM DFSMS: Using Data Sets</i> manual for further details.</p> <p>After allocation, check the LISTCAT output for the Extended addressability indicator, EXT-ADDR, in the Attributes group to ensure that extended addressability is in affect.</p>

8. Copy the old files into the new ones according to the instructions below:



**Table 93 Copy Methods for Expanding Various Control-M Files**

Files	Copy Method
Active Jobs file, Dual Active Jobs file, and AJF for Journaling file	Copy using utility CTMCAJF. For information about the CTMCAJF utility, see the <i>INCONTROL for z/OS Utilities Guide</i> .
Resources file	Copy using utility CTMCRES. For information about the CTMCRES utility, see the <i>INCONTROL for z/OS Utilities Guide</i> .
History Jobs file	Copy using utility CTMHCOP. For information about the CTMHCOP utility, see the <i>INCONTROL for z/OS Utilities Guide</i> .
Journaling file	Copy the old journaling file into the new file using a standard IBM copying utility.
Conditions file for Journaling	Copy using the IOACCND utility. For information about the IOACCND utility, see the <i>INCONTROL for z/OS Utilities Guide</i> .
Resources file for Journaling	Copy using the IOACRES utility. For information about the CTMCRES utility, see the <i>INCONTROL for z/OS Utilities Guide</i> .
Statistics file	Copy the old STAT file into the new file using IDCAMS REPRO.

9. Start the monitors by issuing the following operator command:

```
S CONTROLM
```

## Expanding the IOA Manual Conditions File (NRS)

To increase the size of the IOA Manual Conditions file, see the topic about expanding various IOA files in [IOA Administration](#) (on page 35).

## Active Jobs File Space Reuse Facility

The Active Jobs File (AJF) Space Reuse Facility is used (in parallel with Control-M functionality) to dynamically delete finished scheduled jobs from the Active Jobs File, and reuse the space for new jobs. The AJF Space Reuse Facility is controlled by the REUSTIME and REUSAPPL Control-M installation parameters.

REUSTIME sets the retention period of finished scheduled jobs in the AJF before they are deleted. REUSAPPL specifies the prefix of the APPL parameter for the scheduled jobs that are to be handled by AJF Space Reuse Facility.

For further information see the references to the REUSTIME and REUSAPPL parameters in the *INCONTROL for z/OS Installation Guide*.

For AJF Space Reuse functionality and for keeping information about free and occupied AJF records, Control-M uses new index records (called MIF Index Records) in the AJF file. These index records are created or rebuilt if the AJF Space Reuse Facility is activated (that is, if REUSTIME is not zero) during AJF format or AJF compress (either by the CTMCAJF utility or by the Control-M New Day Procedure). As a result, if you dynamically activate the AJF Space Reuse Facility (by specifying a valid value other than zero for the REUSTIME parameter and by stopping and restarting the monitor), the facility is activated, but only after the next AJF compress or New Day Processing.

To dynamically inactivate the facility, set REUSTIME to zero, stop the Control-M monitor and compress the AJF. After changing the REUSAPPL parameter, the stop and start of Control-M monitor is necessary to apply the new value.

The retention period begins the moment a job finishes, and does not depend on Control-M monitor activity or the moment that a job received ENDED status in Control-M.

The AJF Space Reuse facility deletes finished scheduled jobs that match the following criteria:

1. The jobs must finish with OK, Forced OK, or Deleted status.
2. Scheduled jobs belonging to a SMART Table are processed by the AJF Space Reuse Facility only after the corresponding SMART Table has finished with OK status.

The AJF Space Reuse facility does not delete finished scheduled jobs that match the following criteria:

3. The jobs are in Held status.
4. Jobs with a MAXWAIT value of 99 (unless they are in Deleted status).
5. Jobs containing a Time Zone specification.

## History file processing for AJF space reuse

By default, when the Control-M monitor is started, History file processing for AJF space reuse is enabled. As a result, when a job matches the relevant criteria for space reuse and the job contains a History retention period, the job is copied to the History AJF before its records are designated for space reuse. If History file allocation processing is disabled, a job containing a retention period will subsequently not become a candidate for space reuse. The job will be excluded for space reuse until History file processing is enabled.

History file activity is controlled by issuing modify commands to the Control-M monitor. The following modify commands are available:

---

```
F CONTROLM,HISTALOC=DISABLE
```

---

This command deallocates the History file from the Control-M monitor. As a result, space reuse continues processing without considering for deletion jobs having a History retention period.

The DISABLE command can be used when the History file size must be increased.

---

```
F CONTROLM,HISTALOC=ENABLE
```

---

This command allocates the History file to the Control-M monitor. As a result, space reuse will consider for deletion jobs having a History retention period.

## Expanding the CMEM file configuration

To add new entries to the CMEM file configuration, see the topic about adding, deleting, and/or changing an SMFID in the CPUs List in the *INCONTROL for z/OS Installation Guide*.

## SYSDATA processing

For information on the definition, use, and management of Control-M SYSDATA, see the following:

- *Control-M for z/OS User Guide* > "Introduction to Control-M" > "Control-M Concepts"
- *INCONTROL for z/OS Installation Guide: Installing* > "Installing Control-M" > "Installation considerations"

## Accumulating Job Execution Statistics

Control-M allows accumulation of job execution information using its Statistics file. The accumulated information can then easily be viewed using option S in the Active Environment screen or the JOBSTAT command in Scheduling Definition screen.

Control-M manages statistical information for the most recent job runs, up to a maximum of 200. In a multi-CPU environment, Control-M keeps this information for each CPU (SMF ID) in which the job executes.

The Statistics file is updated by Control-M utility CTMJSA. For more information about this utility, see the *INCONTROL for z/OS Utilities Guide*.

BMC recommends that you include this utility in the New Day procedure. Execute it before executing the User Dailies; this ensures that production jobs always use the most up-to-date information.

In addition to viewing statistical information online, a number of optional facilities can be employed. These optional facilities can significantly enhance production flow and management. These facilities all rely on the information accumulated in the Statistics file.

After proper management of the Statistics file is implemented, information in the file can be effectively used for the following reports and facilities:

- simulation and forecasting
- dataset – job cross-reference (Control-M CTMRJDS utility)
- automatic tape adjustment
- deadline scheduling
- Control-M/Enterprise Manager live simulation
- shout processing, which depends on job elapse time (EXECTIME)
- QUIESCE facility (planned shutdown)

## Elapsed Time Calculation

Control-M calculates the elapsed time of a job to be used for

- IOA Log Message SPY281I
- job statistics calculations

The elapsed time of a job is the amount of time between the start of the job and the end of the job. The elapsed time of a SMART Table is calculated in a similar way. The elapsed time of a SMART Table is the amount of time between the start of the first job of the SMART Table and the end of the last job of the SMART Table.

The calculation of the elapsed time of a job is based on IBM time-related messages. The table shows the principal IBM time-related messages that are generated when most jobs run.

**Table 94 IBM Time-Related Messages Generated on Running Jobs**

Message	Explanation
IEF403I	This message displays the time that the processing of the job began, after any resource contention problem had been resolved. This message appears in the first part of the job output stream.
IEF404I	This message displays the time that the processing of the job ended. The message appears in the first part of the job output stream.
IEF375I	This message displays the time that the job was first initiated into the system, which may have occurred before any resource contention problem was resolved. The message appears in the third part of the job output stream.
IEF376I	This message displays the time that the processing of the job ended. The message appears in the third part of the job output stream.

### IOA Log Message SPY281I

The data required for the elapsed time component of IOA Log Message SPY281I is calculated as follows:

Elapsed time = [IBM Message IEF376I] - [IBM Message IEF375I]

If there was any delay caused by resource contention before or during the execution of the job, Control-M does not subtract the delay time from the elapsed time of the job. This maintains consistency with IBM practice, in treating the job initiation time as the primary job start time.

The elapsed time of a job is displayed in a SPY281I message even if the job ended in one of the following ways:

- The job abended.
- The job ended due to a JCL error (if IBM Messages IEF375I and IEF376I are present in the job output).
- The job ended with a condition code greater than zero.

The CPU (SMF ID) in the SPY281I message is extracted from the IBM message \$HASP373. For users of the Thruput Manager product, the Initiator and Jobclass fields in the SPY281 message might appear as blanks.

## Ordering and Submitting Jobs and Started Tasks

### Job Ordering using New Day Processing

#### Overview

The Control-M monitor is usually activated as a started task and remains active 24 hours a day. At a set time each day (defined using installation parameters), New Day processing is performed by the Control-M monitor.

New Day processing consists of both automatic cleanup from the previous day's job ordering and automatic ordering of jobs for the New Day.

The main components related to New Day processing are

- tables and job scheduling definitions
- New Day procedure and User Daily job
- Date Control records
- Active and History Jobs files
- IOA Conditions file
- Journaling

New Day processing is completely automated through the use of the New Day procedure and User Daily jobs. The main purpose of the New Day procedure and User Daily jobs is to call programs that

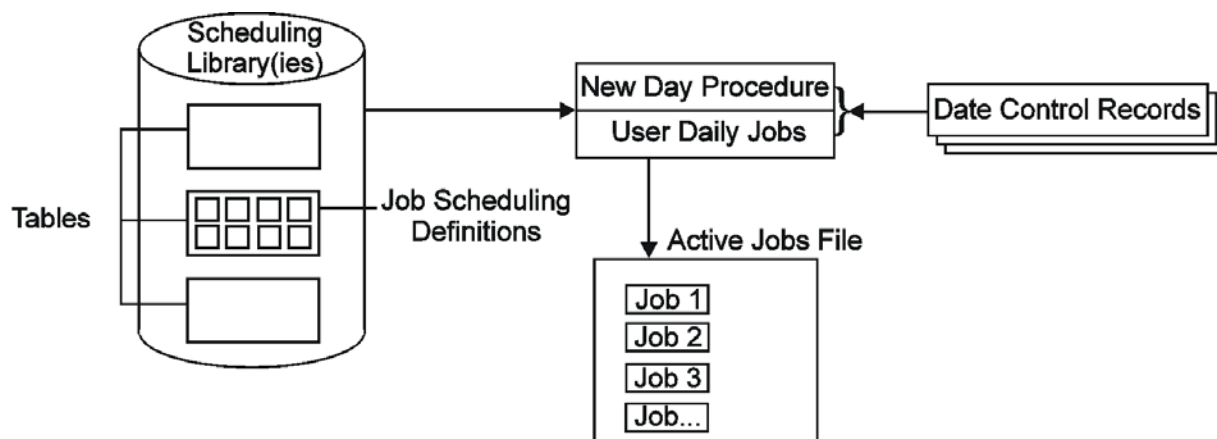
- change the Control-M logical working date
- perform cleanup of previous days' jobs and compress the AJF in the process. If a History Jobs file was defined during Control-M installation, the deleted jobs may optionally be copied to the History AJF
- perform IOA Conditions file cleanup to delete conditions whose ODAT is the same as the upcoming Control-M working date
- scan tables to select jobs for scheduling
- schedule the selected jobs (place copies of the selected job scheduling definitions as job orders in the Active Jobs file)
- perform History Jobs file cleanup based on the retention criteria specified in the jobs' scheduling definition
- delete archived SYSOUT datasets that are no longer referenced by jobs in the AJF or History Jobs file
- back up the previous day's Journal file and initialize the current day's Journal files.

Both the New Day procedure and each User Daily job must have its own Date Control record. A Date Control record is a member in the Control-M PARM library in which relevant date information is placed during New Day processing. This date information is used to manage job orders.

Selection of jobs is based on the Date Control record, the current date and the Basic Scheduling parameters of the jobs in the tables. Any time the User Daily job is run, the current working date is placed in the Date Control record. The Basic Scheduling parameters of each job in the table are checked against this date to determine if the job must be placed in the Active Jobs file.

The following figure shows New Day Processing:

**Figure 21 New Day Processing**



New Day processing generally works as follows:

1. The New Day procedure is performed each day at a predefined time. The New Day procedure:

Schedules User Daily jobs

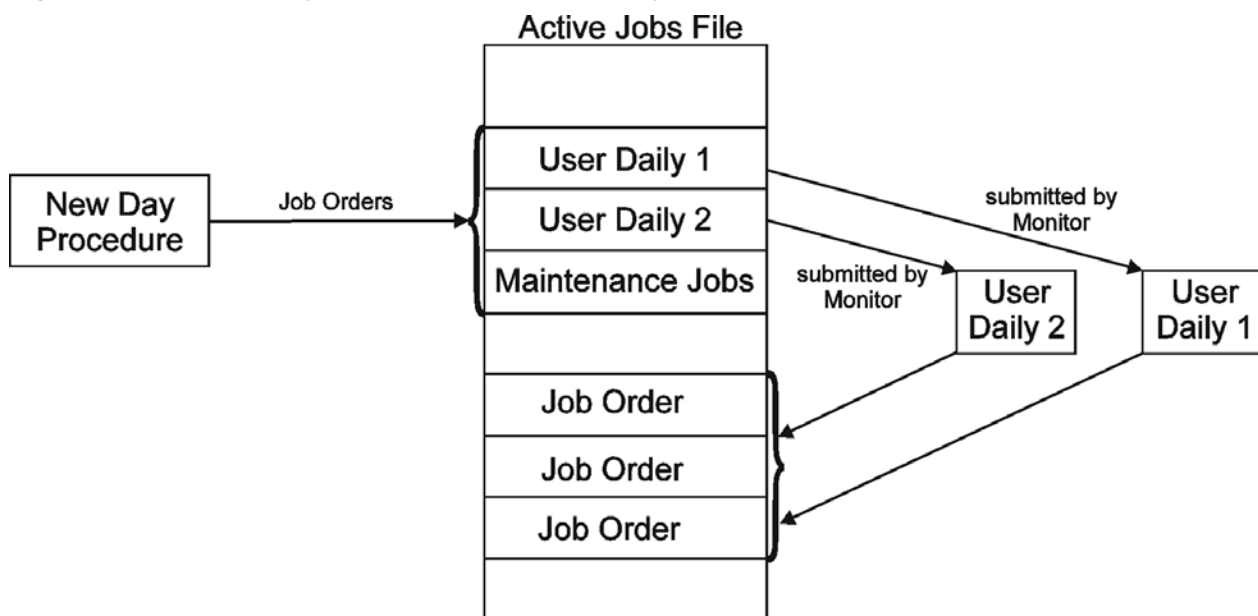
Schedules maintenance jobs. These jobs call programs that perform cleanup after the previous day's processing.

- If a cyclic job is executing at the time the New Day procedure is run, the New Day procedure changes the job to a non-cyclic job and handles the job accordingly.
- If a job that was not submitted on its original scheduling date contains a > specification in its TIME UNTIL field, when the New Day procedure is next run, the procedure deletes the > and TIME FROM specification from the job order, making the job immediately eligible for execution.
- If History Jobs file processing is enabled, jobs deleted from the Active Jobs file during cleanup can be placed in the History Jobs file.

2. User Daily jobs (scheduled by the New Day procedure) select and schedule all other jobs for that day.

The following figure shows New Day Procedure and User Daily Jobs:

**Figure 22 New Day Procedure and User Daily Jobs**



## Sample New Day Processing

Control-M is supplied with samples of several of the above mentioned components.

To effectively implement New Day processing at your site, you must first understand how the sample components operate. Once the operation of the sample components is understood, you can then customize New Day processing based on site requirements. Sample New Day processing components are described in the following section.

## Sample Components Provided With Control-M

At time of installation, each site is provided with the components shown in the table.

**Table 95      Supplied Sample Control-M Components**

Component	Description
New Day Procedure	A single New Day procedure is provided. Its default name is CTMTDAY (the name can be changed). This procedure must have wide authorization for accessing tables and jobs.
User Daily Jobs	<p>The following sample User Daily jobs are provided:</p> <ul style="list-style-type: none"> <li>▪ DAILYSYS - Contains sample JCL for scheduling system jobs.</li> <li>▪ DAILYPRD - Contains sample JCL for scheduling production jobs.</li> </ul> <p>These sample User Daily jobs are defined in table MAINDAY in the SCHEDULE Library. These jobs activate User Daily procedure CTMDAILY, which is responsible for ordering the production jobs.</p> <p>It is generally advisable to use these sample User Daily jobs to create separate User Daily jobs according to department (or other functional entity), and according to authorization. For more information, see <a href="#">Implementing New Day Processing</a> (on page 246).</p>
Maintenance Jobs	<p>The following maintenance jobs are provided:</p> <ul style="list-style-type: none"> <li>▪ IOACLCND - Activates utility IOACLCND, which cleans the IOA Conditions file.</li> </ul> <p>IOACLCND does not delete conditions with a date reference of STAT.</p> <ul style="list-style-type: none"> <li>▪ IOALDNRS - Activates utility IOALDNRS, which creates and loads the Manual Conditions file. (This utility is normally run after all User Daily jobs have executed.)</li> <li>▪ CTMJSA - Activates utility CTMJSA that accumulates and updates the Statistics file.</li> </ul> <p>These maintenance jobs are defined in table MAINDAY in the SCHEDULE library. For a description of utilities IOALDNRS and IOACLCND, see the <i>INCONTROL for z/OS Utilities Guide</i>.</p>
Table: MAINDAY	A table called MAINDAY is provided in the SCHEDULE library. This table contains User Daily jobs DAILYSYS and DAILYPRD and maintenance jobs IOACLCND and IOALDNRS.



Component	Description
Date Control Records	<p>The following Date Control records (members) are supplied in the Control-M PARM library:</p> <ul style="list-style-type: none"> <li>▪ DATEREC - Defined for New Day procedure CTMTDAY.</li> <li>▪ DATERECU - Sample Date Control record for User Daily jobs.</li> </ul>
Called Programs	<p>The New Day procedure and User Daily jobs call programs that perform various steps of New Day processing (checking the Date Control record, selecting job orders, and so on). For a description of these programs, see <a href="#">Programs Called During New Day Processing</a> (on page 250).</p>

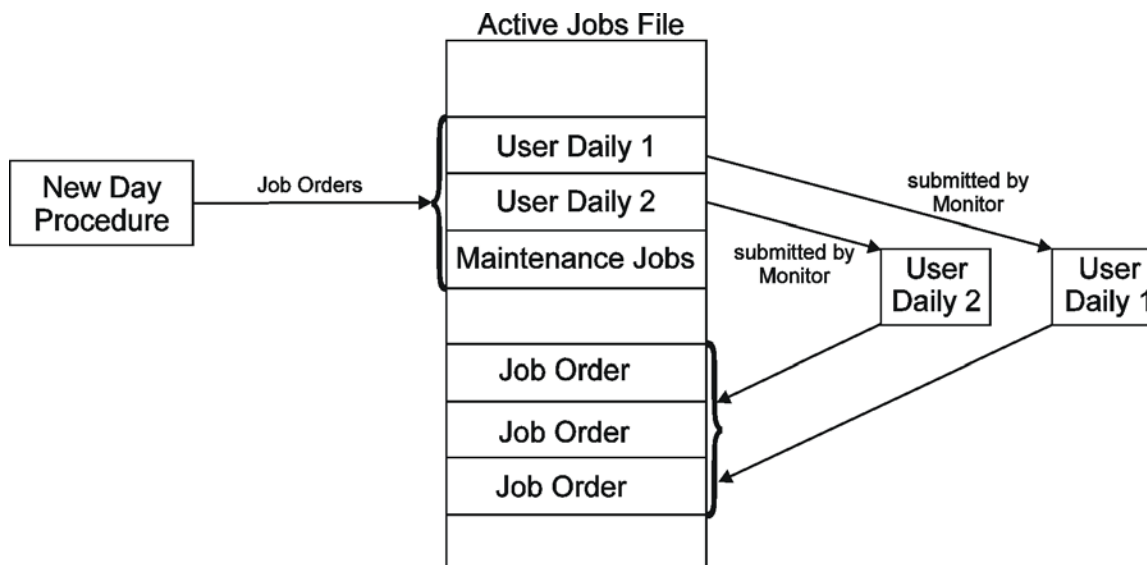
### How the Sample Components Perform New Day Processing

New Day processing performed with the sample components works as follows:

- During New Day processing, the New Day procedure accesses its Date Control record, scans table MAINDAY and selects and loads the maintenance jobs and User Daily jobs to the Active Jobs file.

The following figure shows Sample Components of the New Day Procedure:

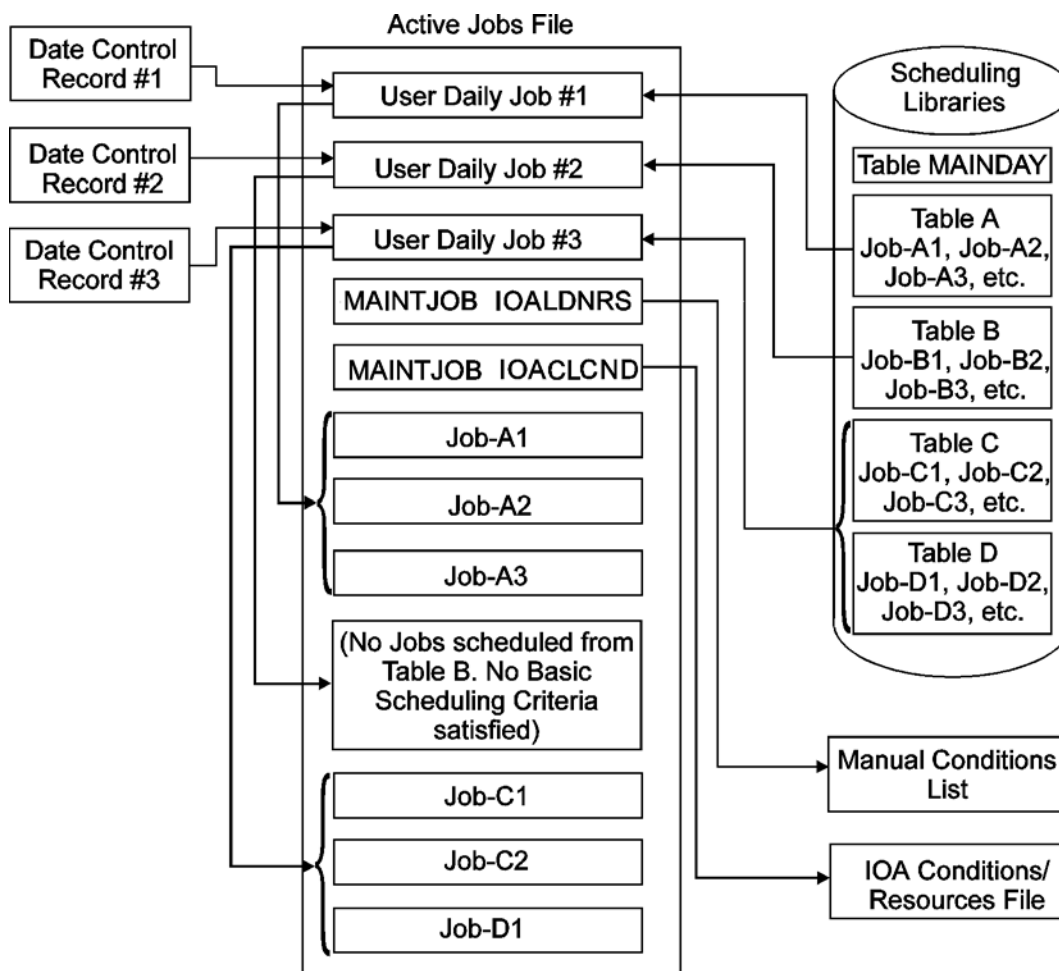
**Figure 23 Sample Components of the New Day Procedure**



- The User Daily and maintenance jobs placed in the Active Jobs file are submitted by Control-M according to their runtime scheduling criteria. When a User Daily job is executed, it accesses its own Date Control record, scans the tables defined to it, selects jobs and places the selected job orders in the Active Jobs file. (User Daily jobs can also schedule maintenance jobs as required.)

The following figure shows Jobs Placed in the Active Jobs File:

**Figure 24 Jobs Placed in the Active Jobs File**



Because the User Daily is a job, its use is not restricted to New Day processing. Although User Daily jobs are normally executed immediately after they are ordered by the New Day procedure, they can be executed at any time defined in their Runtime Scheduling parameters. Furthermore, they can be ordered at any time by any of the methods described in the selected implementation issues chapter in the *Control-M for z/OS User Guide*.

## Date Control Records and Enhanced Daily Checkpointing

A Date Control record must be defined for each User Daily job. This record is usually defined by the INCONTROL administrator.

The Date Control record for User Daily jobs consists of six fields. At different stages in New Day processing (before or after the execution of specific called programs that perform New Day processing), the current original scheduling date is placed in one of these date fields.

This enables Control-M to manage the process of job ordering. Furthermore, if New Day processing or a User Daily job is interrupted at any point, the values in these fields can indicate which called program was in use when the interruption occurred.

## Enhanced Daily Checkpointing

The Enhanced Daily Checkpoint record is the second record in the Date Control member. It contains fields that store information about the last ordered job: JCL member name, internal sequence number, order ID, and the SMART Table to which the job belongs. (For a description of the format of this record, see [Create Date Control Records](#) (on page 243).) If an interruption occurs during job ordering, the Enhanced Daily Checkpointing record enables precise identification of where job ordering stopped. During recovery, job ordering continues from that point.

BMC cautions against deleting an Enhanced Daily Checkpoint record. If you need to rerun User Daily, and the Checkpoint record has been deleted (or was never present), then all jobs in the table are considered for scheduling, including jobs already scheduled by the interrupted run.

If the job belongs to a SMART Table, the recovery procedure reorders the entire SMART Table. The original SMART Table Entity remains in the Active Jobs file, together with the jobs that were ordered prior to abnormal termination. However, the status of the original SMART Table Entity is set to HELD WAIT SCHEDULE to prevent the jobs in that SMART Table from being submitted. Changing the status of the original SMART Table Entity using the Online facility is blocked.

The same Date Control Record cannot be shared by the Newday procedure, by different User Dailies, and any jobs that invoke the CTMJOB utility. Failure to allocate unique Date Control records for each task that requires one may lead to unpredictable job ordering results.

Before the ordering process starts, the program checks if the checkpoint fields in Record 2 are blank.

If the checkpoint fields are blank, the User Daily job continues normal processing. Before each job is ordered, the fields in Record 2 are updated (overwritten) with information identifying the current job being ordered. Only upon successful completion of the User Daily job is the information in the checkpoint fields erased.

If the checkpoint fields are not blank, the recovery procedure described in [Recovery Procedure Using Enhanced Checkpointing](#) (on page 245) is activated.

As part of "Continue on Cards Error" processing, if parameter CINTERCRD in member CTMPARM is set to yes, Control-M does not stop the ordering process. Control-M continues even if errors exist. Checkpointing in this case is only relevant for abends or premature termination.

## Create Date Control Records

Date Control records are members in the Control-M PARM library. A different Date Control record must be defined for each User Daily job. It is usually defined only once for each job and from then on it is usually updated by the User Daily job.

The length of the User Daily Date Control record is 80 characters. The format of the dates in the record is *mmddyy*, *ddmmyy* or *yymmdd*, depending on the site standard.

The table shows the format of the Date Control record and indicates when the User Daily adds the original scheduling date values to the fields in the record.

**Table 96**      **Date Control Record Format**

Column	Value Added	Description
01–06	date1	User Daily adds the ODATE before the User Daily procedure is begun.

Column	Value Added	Description
18–23	date2	User Daily adds the ODATE before the job ordering process begins for jobs being scheduled based on DATES, DAYS, and/or DCAL parameters.
25–30	date3	User Daily adds the ODATE after the job ordering process ends for jobs being scheduled based on DATES, DAYS, and/or DCAL parameters.
43–48	date4	User Daily adds the ODATE before the job ordering process begins for jobs being scheduled based on WDAYs and/or WCAL parameters.
50–55	date5	User Daily adds the ODATE after the job ordering process ends for jobs being scheduled based on WDAYs and/or WCAL parameters.
60–65	Blank (date7)	<p>In the User Daily Date Control records, these columns are blank.</p> <p>In the New Day procedure Date Control record, these columns are the last formatting date, date7, of the Active Jobs file (used by program CTMFRM). This field prevents formatting from being carried out twice on the same day. When this date is in a record, program CTMCHK recognizes the record as a New Day procedure Date Control record. If there are any problems concerning the date, the program presents the operator with a series of prompts.</p>
		Note: Misuse of this field by the user frequently leads to the display of error message CTM916W. For more information, see the INCONTROL for z/OS Messages Manual.
67–72	date6	User Daily adds the ODATE upon completion of all processing.

A second Date Control record is defined for each User Daily job to implement Enhanced Daily Checkpointing. The column formats of this record are described in the table.

**Table 97      Format of the Second Date Control Record (for Enhanced Daily Checkpointing)**

Column	Constant or Value Added	Description
01–04	JOB=	Constant.
05–12	blank	In this area, Control-M stores the MEMNAME value of the last ordered job.
13–23	,SERIAL_NO=	Constant (note the comma before the "S").
24–28	blank	In this area, Control-M stores its internal sequence number of the last ordered job.
29–37	,ORDERID=	Constant (note the comma before the "O").
38–42	blank	In this area, Control-M stores the order ID of the last ordered job.
43–49	,GROUP=	Constant (note the comma before the "G").
50–69	blank	In this area, Control-M stores the group name of the last ordered job.

When creating this record, the user must

- specify the indicated constants (for example, JOB) in the appropriate columns
- leave blank the columns indicated as blank. These columns are filled in by the User Daily during processing

When a SMART Table is ordered, the values in the second Date Control record will be those of the SMART Table Entity, even if a failure occurs in one of the SMART Table's jobs.

### Recovery Procedure Using Enhanced Checkpointing

When a SMART Table is ordered, the values in the second Date Control record will be those of the SMART Table Entity, even if a failure occurs in one of the SMART Table's jobs.

The program passes over the jobs in the input tables, counting the jobs and comparing the count to the value in the SERIAL\_NO field, until the count and serial number match. The matching job is selected.

The program then compares the values in the JOB and GROUP fields to the values belonging to the selected job. If the fields do not match, error message CTMD67S is issued and processing terminates.

- If the fields match, the program checks the Active Jobs file for a job with an order ID matching the order ID recorded in Record 2. If the match is found, an additional check is performed to verify that the job's MEMNAME and GROUP values match the checkpoint JOB and GROUP values.
- If the Active Jobs file already contains the job, the job is not ordered again and the program switches to normal processing starting with the next job.
- If the Active Jobs file does not contain the job, the job is ordered. The program then switches to normal processing.

If input tables are modified prior to rerunning User Daily jobs (or the New Day procedure), the checkpointed job and internal sequence number might not match. In this case, rerun of the User Daily jobs is terminated and manual intervention is required.

If a problem is encountered in Newday processing related to job ordering, the Newday procedure can be rerun using the ORDERONLY parameter as follows:

```
S CTMTDAY,NEWDAY=ORDERONLY
```

The job can be run while the Control-M monitor is active.

## Implementing New Day Processing

As indicated above, sample User Daily jobs DAILYSYS and DAILYPRD are supplied with Control-M in table MAINDAY.

In theory, it is not necessary to use User Daily jobs. It is possible (but not recommended) to place all job scheduling definitions in one or more tables and have them scheduled by the New Day procedure.

It is also possible (and also not recommended) to maintain only the two sample User Daily jobs provided with Control-M and to order all user jobs through the User Daily DAILYPRD.

The recommended method to automate the production environment using New Day Processing is by

- defining a different table for each set of related jobs
- defining a different User Daily job for each department, application or comparable entity

The table described the advantages that such an implementation provides.

**Table 98 Advantages of Recommended Method of Automating the Production by Means of New Day Processing**

Advantage	Description
Improved performance	Many User Daily jobs running in parallel can order the full day's production jobs in significantly less time than can one User Daily that orders all jobs individually.
Ease of administration	The INCONTROL administrator can make each department responsible for its own User Daily jobs and tables and for controlling its own job ordering.
Increased security	While maintaining exclusive authorization for the New Day procedure, the INCONTROL administrator can limit each department's authorization to its own User Daily jobs.
Minimization of problems	Problems encountered in one User Daily do not necessarily affect the job ordering of other User Daily jobs.

## Differences Between the New Day Procedure and User Daily Jobs

The New Day procedure uses the program list in member PROGDAYM. User Daily jobs use the program list in member PROGUSR.

The New Day procedure uses Date Control record DATEREC (which contains the last Active Jobs file format date in columns 60 through 65). User Daily jobs use Date Control record DATERECU (which contains blanks in columns 60 through 65). Using the wrong Date Control record causes message CTM916W to be generated.

User Daily jobs can be run manually (that is, not initiated by the Control-M monitor.) However, the Control-M monitor must initiate the New Day procedure. If an attempt is made to run the New Day procedure manually, problems may be caused by failure of the Control-M monitor to free the Active Jobs file for use by the New Day procedure.

## Implementation Tasks

Perform the following tasks when implementing New Day processing:

1. Decide which User Daily jobs are needed (and for which tables)
2. Customize the New Day procedure.
3. Use the sample JCL to create JCL for each User Daily job
4. Create User Daily job scheduling definitions and customize table MAINDAY
5. Create Date Control and Enhanced Daily Checkpointing records

Date Control records cannot be contained in a PDSE-type library.

The New Day procedure and its accompanying Date Control record are defined at time of installation. They require no further implementation.

6. Ensure subsequent runs of utility IOALDNRS if necessary

## Decide Which User Daily Jobs Are Needed (and for Which Tables)

A job scheduling definition is defined for each job and each job scheduling definition is placed within a table. Usually, related job scheduling definitions are grouped into their own table.

Based on the tables defined at your site and the jobs they contain, decide what User Daily jobs you require, and which tables each User Daily job must scan.

## Customize the New Day Procedure

The New Day procedure normally performs a cleanup of the AJF, the History AJF, and the IOA Conditions file automatically. The criteria by which jobs and conditions are deleted from the AJF, the History AJF, and the IOA Conditions file are illustrated in the CTMFRM program, described in [Programs Called During New Day Processing](#) (on page 250). The user may change the default actions of CTMFRM by coding SELECT and IGNORE statements in the DAFRMIN DD statements, in both the main step and the CLRHIST step of the CTMTDAY procedure. The DD statements DAFRMIN reference members IGNORE and IGNORHST in the main and CLRHIST steps respectively. For further information, see [SELECT and IGNORE Statements](#) (on page 248). Using these SELECT and IGNORE statements, the user can cause jobs and conditions that normally would be deleted to be retained, and vice versa.

## SELECT and IGNORE Statements

SELECT and IGNORE statements identify jobs or conditions that must or must not be deleted.

One or more parameters can be specified in any SELECT or IGNORE statement (in any order). For a description of parameters GROUP, JOBNAME, MEMBER, STATUS, FROM, and TO, see the CTMCAJF utility in the *INCONTROL for z/OS Utilities Guide*.

A job specified for deletion using a SELECT statement is deleted unconditionally even if the job is currently executing.

Conditions that are not date-related can be defined with a date reference of STAT, which eliminates the need for including SELECT or IGNORE statements in procedure CTMTDAY.

## Examples

### Example 1

To suppress the erasure of the next day's conditions by the New Day procedure, specify the definition

---

```
IGNORE COND *
```

---

When suppressing the function, remember to delete conditions (using utility IOACLCND). If this is not done, jobs in the next year's schedule is triggered because of today's conditions.

### Example 2

---

```
IGNORE JOBNAME OPER*  
IGNORE JOBNAME PROD* STATUS ENDNOTOK  
SELECT GROUP TEST
```

---

In this example, no jobs whose names begin with prefix OPER are deleted. Also no jobs whose names begin with prefix PROD that ended NOTOK are deleted. Of the remaining jobs, those belonging to group TEST are deleted. In addition, the default action is also taken. All jobs that ended OK and all jobs whose MAXWAIT interval is exceeded are also deleted even though they are not part of group TEST.

### Example 3

---

```
IGNORE STATUS ACTIVE  
SELECT JOB OPER*
```

---

In this example, jobs whose names begin with prefix OPER are deleted if they are in WAITSCHED, ENDOK or ENDNOTOK status (that is, jobs whose status is ACTIVE are not deleted). In addition, the default action is also taken. All jobs that ended OK and all jobs whose MAXWAIT interval is exceeded are also deleted even though they do not begin with prefix OPER.

AutoEdit variables and functions are supported in the SELECT and IGNORE statements. For more information, see the CTMCAJF utility in the *INCONTROL for z/OS Utilities Guide*.



## Use the Sample JCL to Create JCL for Each User Daily Job

Create the JCL for each User Daily job by selecting one of the alternative methods of identifying tables (below) and customizing the JCL accordingly.

**Table 99 Methods for Identifying Tables**

Method	Description
Method 1	<p>DSN=sched_library(table)</p> <p>This method requires that the user specify the name of a table and library directly in the JCL.</p> <pre>//DAILY EXEC CTMDAILY //DACHK DD DISP=SHR,DSN=parm_lib(date_control_record) //DAJOB DD DISP=SHR,DSN=sched_library(table1) //      DD DISP=SHR,DSN=sched_library(table2) //      DD DISP=SHR,DSN=sched_library(table3)</pre>
Method 2	<p>DSN=parm_library(member)</p> <pre>//DAILY EXEC CTMDAILY //DACHK DD DISP=SHR,DSN=parm_lib(date_control_record) //DAJOB DD DISP=SHR,DSN=parm_library(member)</pre> <p>This method requires that the user specify a parm_library and member containing ORDER requests that identify scheduling libraries, tables, and jobs to schedule—and/or in-stream ORDER requests—following //DAJOB DD *</p> <p>Method 2 provides the following advantages over Method 1</p> <ul style="list-style-type: none"> <li>Changes required can be made to the member in the parm_library without changing the JCL of the User Daily job.</li> <li>Individual jobs can be specified.</li> <li>An entire library can be ordered with one order statement in the format: ORDER DSN=AAA.BBB.CCC, MEMBER= *</li> <li>When using Method 2, specify at least one ORDER statement and, optionally, SELECT or IGNORE statements.</li> <li>The Date Control record is referenced by DD statement DACHK.</li> <li>For the syntax, parameter descriptions and functionality of the ORDER, SELECT and IGNORE statements, see the CTMJOB utility in the <i>INCONTROL for z/OS Utilities Guide</i>.</li> </ul>

## Create User Daily Job Scheduling Definitions and Customize Table MAINDAY

The supplied sample User Daily jobs, DAILYPRD and DAILYSYS, scan the tables referenced by DD statement DAJOB. However, different authorization is granted to each of these User Daily jobs.

Use these sample User Daily jobs to create a User Daily job for each department in table MAINDAY. Assign the authorizations accordingly. Each User Daily job must scan a different set of tables than the other User Daily jobs.

It is common in many sites for the INCONTROL administrator to create a customized User Daily job for each department and then turn the table over to the control of the department. The department can then modify the table (and job scheduling definitions) as necessary.

Although User Daily jobs can execute immediately after the jobs have been placed in the Active Jobs file, a site may choose to delay execution of a User Daily. To delay the submission of a User Daily, define the User Daily's runtime scheduling criteria accordingly.

If groups of User Daily jobs are executed at different times, rerun IOALDNRS after running each group of User Daily jobs.

Add additional maintenance jobs table MAINDAY as necessary.

## Ensure Subsequent Runs of Utility IOALDNRS if Necessary

If all User Daily jobs are scheduled to run in parallel, utility IOALDNRS only needs to run once, after the User Daily jobs have finished execution. However, if User Daily jobs are executed at various times during the day, utility IOALDNRS must be run after each group of User Daily jobs is executed. This can be ensured by having each group of User Daily jobs set the appropriate prerequisite conditions to ensure the execution of IOALDNRS.

## Programs Called During New Day Processing

The most important programs in New Day processing are CTMILZ and CTMILU.

- The New Day procedure executes program CTMILZ.
- Each User Daily calls procedure CTMDAILY, which executes program CTMILU.

Programs CTMILZ and CTMILU both execute other programs that implement New Day processing. The programs called by CTMILZ and CTMILU are listed in the table below. Both CTMILZ and CTMILU read the member referenced by DD statement DAPROG and activate the programs listed in the member.

The following table describes the format for each record in the program list:

**Table 100 Column Format for Program List Records**

Column	Description
01–08	Program name
10–11	Maximum return code allowable in the preceding program If a higher return code is encountered in the preceding program, the current program is not executed.
13–72	Program arguments

The following table shows the programs called by program CTMILZ (the New Day procedure) and by program CTMILU (User Daily jobs).

**Table 101 Programs Called by New Day Procedure and User Daily Jobs**

Program	Purpose
CTMCHK	<p>(called by CTMILZ and by CTMILU)</p> <p>Checks the current date and its relation to the Date Control record (described in the topic <a href="#">Use of the Date Control Record by User Daily Jobs</a> (on page 253). When called by CTMILZ, the program always prompts the operator to verify that Control-M is activated on the correct date.</p> <p>When called by CTMILU, the program prompts the operator to verify that Control-M is activated on the correct date only if the value CONFIRM is specified as the program argument (anywhere within columns 13 through 72).</p>

Program	Purpose
CTMFRM	<p>(called by CTMILZ)</p> <p>Reformats the Control-M Active Jobs file, Control-M History Jobs file, and the IOA Conditions file:</p> <p>Control-M Active Jobs File</p> <p>By default (that is, if no SELECT or IGNORE statements are specified), the following jobs are erased from the Active Jobs file and the file is compressed:</p> <ul style="list-style-type: none"> <li>▪ Jobs that have already executed and ended OK (regardless of parameter MAXWAIT).</li> <li>▪ Job whose MAXWAIT parameter has been exceeded.</li> <li>▪ Emergency jobs that are not needed.</li> <li>▪ Activate the AJF Space Reuse facility if requested.</li> <li>▪ Jobs for which MAXWAIT=99 is specified are not automatically erased from the Active Jobs file. For more information, see <a href="#">SELECT and IGNORE Statements</a> (on page 248).</li> </ul> <p>Control-M History Jobs File</p> <p>Compresses the Control-M History Jobs file (if activated) by removing jobs whose retention criteria (RETENTION – # OF DAYS or GENERATIONS TO KEEP) have been exceeded.</p> <p>IOA Conditions File</p> <p>This program erases all prerequisite conditions whose data is the same as the new Control-M working date (that is, this program erases all prerequisite conditions of the coming execution date).</p> <p>Warnings:</p> <ul style="list-style-type: none"> <li>▪ When a job is ordered with a future date (that is, by using the 'Wait for ODATE' feature), the conditions associated with this job that specify a date reference of ODAT are resolved with that future date. This may lead to the conditions being prematurely deleted by the New Day procedure. To prevent this, the user should include the statement <pre>IGNORE COND *</pre> as input to the New Day procedure via the DAFRMIN DD statement. For more information, see "Implementing New Day Processing."</li> <li>▪ Do not keep prerequisite conditions in the IOA Conditions file for more than one year. Otherwise, jobs may be submitted for execution due to prerequisite conditions set on the same date in the preceding year.</li> </ul> <p>At start of execution, this program creates a backup copy of the Active Jobs file (BKP file) for recovery purposes.</p>

Program	Purpose
CTMJOB	(called by CTMILZ and by CTMILU) Places job orders in the Active Jobs file according to the date in the Date Control record and the data in the tables supplied.
CTMPDA	(called by CTMILZ and by CTMILU) Marks the end of the Daily run.

If History Jobs file processing is enabled, program CTMFRM is run again using program CTMILZ, this time against the History Jobs file, as shown in the above table.

If Control-M/Restart is installed or the History feature is activated, steps DELARCH and CLRHIST are run after the conclusion of program CTMILZ, as shown in the following table:

**Table 102 Additional Steps Executed by New Day Procedure if Control-M/Restart Is Installed or the History feature is activated**

Program	Purpose
CTMDAS	Deletes archived SYSDATA of jobs that were deleted from the Active Jobs file by program CTMFRM.
CTMHSC	Deletes expired jobs from the History Jobs file.

The following table shows the additional step that is run to copy the Control-M Journaling file:

**Table 103 Additional Step Executed by New Day Procedure if the Control-M Journaling feature Is Activated**

Program	Purpose
IKJEFT01	Copies the Control-M Journaling file to a backup file (via CLIST CTMCJNL).

## Use of the Date Control Record by User Daily Jobs

The workflow of User Daily jobs is dependent on the Date Control record. The main steps of a User Daily job are

- checking the last running date of the User Daily job (using internal program CTMCHK)

The first date in the Date Control record (columns 1 through 6) is compared to the current working date (at the time of the run).

- If they match, the User Daily job has already run today. An appropriate message is issued and the condition code is set to 0008.
- If the current working date is earlier than the first date of the Date Control record, a User Daily job run has been attempted before its time. The User Daily job stops executing and notifies the user accordingly.

- If the current working date is later than the first date of the Date Control record (the normal situation), the first date of the Date Control record (columns 1 through 6) is updated to the current working date. This date is then used as the current scheduling date.

If the User Daily job did not run for more than one day, a warning message is issued, and the User Daily job tries to schedule the jobs for all of the days that have passed since the last scheduling date (according to the production parameters).

However, if the program list record for program CTMCHK contains the program argument CONFIRM, the User Daily issues a series of WTOR messages. For information about operator responses to these messages, see [New Day Procedure Flow](#) (on page 254).

- placing job orders in the Active Jobs file according to the current scheduling date and the last running date (using utility CTMJOB)

There are two methods for placing job orders in the Active Jobs file using utility CTMJOB. For a description of both methods, see [Use the Sample JCL to Create JCL for Each User Daily Job](#) (on page 249).

For each job, the program checks whether the job must be scheduled on one or all of the days that have passed since the last original scheduling date (date3 or date5) until the working date in the record (date1). If the job must be scheduled, a job order is placed in the Active Jobs file.

When the program finishes processing the user tables, the finish indicator dates (date3 and date5) are updated to the working date (date1) calculated by program CTMCHK.

Before program CTMJOB starts operating, it compares date2 with date3 (and date4 with date5). If they do not match, a previous run of program CTMJOB of the same User Daily job has probably abended. The user is notified and the program terminates. To correct the error, adjust the date values in the user Date Control record (using a standard editor).

When manually modifying the Date Control record, make sure that jobs are not scheduled to run twice on the same day.

indicating that the User Daily job has ended (using program CTMPDA)

Program CTMPDA updates the finish indicator date (date6) by setting it to the value of the running date (date1). This indicates that the User Daily job finished successfully.

- rerunning the User Daily job after a failure

For further information, see [Date Control Records and Enhanced Daily Checkpointing](#) (on page 242).

## New Day Procedure Flow

Once a day, at a time set by the INCONTROL administrator, the Control-M monitor begins New Day processing by going into a suspended state and issuing the following messages (the first is a highlighted, unrollable message):

```
CTM113I Control-M MONITOR monitor NEW DAY PROCESSING STARTED
CTML00I Control-M MONITOR monitor PROCESSING SUSPENDED
CTML07W Control-M MONITOR monitor WAITING FOR NEWDAY PROCEDURE
```

Shortly after that last message is issued, started task CTMTDAY (the New Day procedure) is automatically activated.

If CTMTDAY finishes executing without any problems, the following messages are issued, and the suspended Control-M monitor resumes normal processing:

```
CTML01I Control-M MONITOR monitor PROCESSING RESUMED
```

```
CTML02I Control-M MONITOR monitor NEW DAY PROCESSING COMPLETE
```

- If a problem occurs during the formatting step (CTMFRM) of CTMTDAY processing, the Control-M monitor prompts the operator for an appropriate response using the following messages:

```
CTML05W NEW DAY PROCESSING ERROR DETECTED
```

```
CTML06W REPLY "R" FOR RESUME OR "E" FOR END
```

The operator should try to correct the problem and rerun the CTMTDAY procedure as described below. Once the CTMTDAY procedure runs successfully, the operator should reply R to message CTML06W, which enables the

Control-M monitor to resume normal processing. Terminating execution of the Control-M monitor (option E) should only be requested if the problem cannot be corrected.

Procedure CTMTDAY can be rerun—while the Control-M monitor is suspended for Newday processing—in one of the modes described in the following table.

**Table 104 CTMTDAY modes with Control-M monitor suspended**

Command	Description
S CTMTDAY	AJF formatting and job ordering are performed as in normal Newday processing. The formatting step includes deletion of the current Control-M working day conditions from the IOA Conditions file.
S CTMTDAY, NEWDAY=ORDERONLY[ ,date ]	Performs job ordering only and not AJF formatting. If date is not specified, the current ODATE is used. Otherwise, date determines the ODATE.
S CTMTDAY,NEWDAY=FORMATONLY	Performs AJF formatting only (equivalent to the COMPRESS command of utility CTMCAJF). Does not delete conditions for the current working day.

If the CTMTDAY problem is related to a Table problem, setting parameter CINTERCRD to Y in member CTMPARM can avoid such CTMTDAY failures. If this parameter is set to Y, the ordering process bypasses scheduling errors within a job, and skips to the next job. If the error is in a SMART Table Entity or in a job belonging to a SMART Table, processing skips the entire table and continues with the next job or table. If the CINTERCRD parameter is set to N, it may be necessary to rerun the job ordering process of the CTMTDAY procedure, as follows:

```
S CTMTDAY,NEWDAY=ORDERONLY
```

- During New Day processing, CTMTDAY checks the system date and time against what it expects to find in the Control-M control files. If they do not match, the operator is prompted with the following messages:

```
CTM426W CTMTDAY "DAILY" DID NOT RUN FOR nnnnnn DAYS
```

```
CTM43CI CONTENTS OF DATE Control RECORD:
```

```
CTM437I date-1 date-2 date-3 date-4 date-5 date-6 date-7
CTM439W REPLY 'C' TO CONTINUE, 'U' TO UPDATE DATEREC TO
        CURRENT DAY EXECUTION, OR 'E' TO END
```

Respond using one of the following options:

- If the computer has not been working for a few days (for example, a hardware failure or holiday), enter one of the following:
  - C—all conditions in the IOA conditions file whose date corresponds to the intermittent days will be deleted. If RETRO is enabled in the scheduling definition, jobs for all intermittent days will also be ordered.
  - U—updates the Date Control Record to the current system date and continues execution. (Only jobs scheduled for the current working day will be ordered.)
- If the computer was IPLed with the wrong date, enter E, check and correct the date on the computer, and then restart procedure CTMTDAY.
- If the date on the computer is correct and was working the previous day, contact the INCONTROL administrator to check the cause of the problem.

If the Control-M monitor has been down for more than 28 days, the previous working date (the current working date minus 1) must be manually specified as date values 1 through 6.

## Managing User Daily Jobs from Control-M/EM

The content of User Daily jobs executing in an MVS datacenter can also be managed from the Control-M/Enterprise Manager which runs on a Windows platform. Special User Daily jobs must be defined for this purpose. They provide a means by which the following functions can be performed from Control-M/EM:

- Add a table residing in a specific library to an existing user daily job.
- Change the location of a table by moving it from one user daily job to another.
- Delete a table from a user daily job.

For more information, see the Control-M User Guide (for Control-M/EM).

By default, the EMUSDLY parameter, in the CTMPARM member, is set to Y, enabling the processing of these Special User Daily Jobs. Since IOA Global variables store the User Daily data uploaded from Control-M/EM, the necessary global variable database structures and either Control-M Event Manager or Control-O must be active for the processing of the Special User Daily Jobs. (If for some reason this is a problem, then the EMUSDLY parameter must be set to N.) In addition to the Special User Daily jobs, which are processed using the CTMEMUDL procedure, those tables that are specified from Control-M/EM to run automatically (and are therefore marked as SYSTEM tables) are also processed as part of the New Day procedure. It is the responsibility of the Control-M Administrator to schedule the execution of the other User Daily jobs. For more information, see the *INCONTROL for z/OS Installation Guide*.

Use the following JCL template to run the CTMEMUDL procedure:

```
EXEC CTMEMUDL,EMDAILY=userdailyname
```

Before issuing the command replace userdailyname with a 10 character name referring to a set of tables to be ordered in the AJF.



The CTMEMUDL procedure generates ORDER statements for all tables belonging to the Control-M/EM User Daily job, userdailyname. The ORDER statements are subsequently processed by the CTMJOB utility, which places the jobs in the AJF.

To view the contents of a specific Control-M/EM User Daily job, use the LIST option as shown in the following command:

```
EXEC CTMEMUDL,EMDAILY='userdailyname,LIST'
```

To view the contents of all Control-M/EM User Daily jobs, use the '\*',LIST' option as shown in the following command:

```
EXEC CTMEMUDL,EMDAILY='*,LIST'
```

## Job Ordering and Submission Considerations

### Library Compression

If a job is ordered or submitted while certain libraries are being compressed, the member may not be found or the wrong job may be submitted. To avoid this problem, compress a library only when Control-M is down, or no jobs contained in or referencing the library are being submitted or ordered. The following libraries are relevant to this issue:

- the JCL library
- Control-M job scheduling libraries
- IOA calendar libraries

### JCL Parameter MSGLEVEL

Output of a Control-M job is written to the Control-M SYSDATA only if a MSGLEVEL of (1,1) is specified. If Optional Wish WM0735 is applied at your site and no MSGLEVEL, or a MSGLEVEL other than (1,1) is specified, Control-M automatically changes the MSGLEVEL to (1,1).

### Comment Lines Added During Job Submission

Control-M adds the following comment lines to the JCL output of each job that is executed using Control-M:

```
/*-- SUBMITTED BY Control-M (FROM lib)      ODATE=odate
/*-- SCHEDULE schedlib(sched-table)
/*-- SCHEDULED DUE TO RBC: rbc-name
/*-- JCL      jcllib(jclmembr)
/*-- Control-M JOB IDENTIFICATION: ORDER ID=order-id RUN
NO.=run-number
```

where

- lib is either MEMLIB or OVERLIB
- odate is the Control-M order date
- schedlib is the scheduling library from which the job was ordered
- sched-table is the table from which the job was ordered
- rbc-name is either blank or (for jobs in SMART Tables) the schedule RBC that caused the job to be ordered
- jcllib is the JCL library from which the job was submitted
- jclmembr is the JCL member from which the job was submitted
- order-id is the Control-M order id assigned to the job
- run-number is the number of times the job has run or rerun

If Control-M is upgraded from a non-supported version, the values for the scheduling library, table, JCL library, and JCL member may appear as UNKNOWN for jobs ordered before the upgrade.

The value in the SCHED comment line is also indicated as UNKNOWN when you perform an AutoEdit simulation using the JCL library mode.

## Volume Defragmentation and Compaction

If a job is ordered or submitted while DASD volumes containing IOA or Control-M libraries are being defragmented or compacted by DASD management products, the library may be in use, not found or not cataloged—causing the job not to be submitted. To avoid this problem, defragment or compact volumes containing IOA or Control-M libraries only when Control-M is down, or no jobs contained in or referencing these libraries are being ordered/submitted.

The following libraries are relevant to this issue:

- The JCL library
- Control-M job scheduling libraries
- IOA calendar libraries

At sites where running the above type of DASD housekeeping while Control-M is active is unavoidable, carefully set the following parameters (defined in member CTMPARM of the IOA PARM library) to alleviate the problem:

- INUSE#RT
- INUSE#WI

## Job Order Interface—Defining Job Lists for Each User

When an end user orders jobs using the End User Job Order Interface utility, the list of jobs that end user can order is displayed. For more information, see the online facilities chapter in the *Control-M for z/OS User Guide*.

When using the End User Job Order interface, a user is permitted to order jobs in tables determined by the INCONTROL administrator. Multiple users can utilize the same table. The INCONTROL administrator must ensure that the tables do not contain jobs with duplicate jobnames.

To identify which table each user can utilize, the INCONTROL administrator defines a special control member. This control member lists users and the available table for each user.

The control member must be defined in a PDS with LRECL=80, RECFM=F, or FB. The default location is the @@USRTBL member in the Control-M SCHEDULE library, but these values are parameters to CLIST and CTMJBT, and can be modified according to site requirements. This control member may contain multiple lines for each user ID or mask, and is maintained by the INCONTROL administrator.

The following table shows how each line is formatted:

**Table 105      Format of Lines in the Control Member**

Columns	Description
Cols 1–8	TSO user ID or mask. See <a href="#">TSO User ID Masking</a> (on page 259).
Col 9	Blank.
Cols 10–17	Table name in the scheduling table library.
Cols 18–19	Blank.
Cols 20–63	Name of the scheduling table library (required only if different from the library where the control member is located). If this entry is non-blank, it must contain a fully qualified dataset name including the high-level qualifier and must not be enclosed in quotes.
Col 64	Blank.
Cols 65-72	Jobname prefix. If this field is blank, the user can order any job in the table. If a user is to be permitted to order only certain jobs from the table that is coded in column 10, use column 65 to specify a jobname prefix for those jobs.
Col 73	Indicates whether the jobname in column 65 is to be treated as a full jobname or a generic jobname prefix. An X in column 73 prevents the jobname from being treated as a generic prefix name.

The @@USRTBL member must not contain TSO line numbers in columns 73-80.

Any line containing an asterisk in the first column is treated as a comment and is not processed.

## TSO User ID Masking

An asterisk (\*) specified as the final non-blank character represents any number of characters (including no characters). For example, if columns 1 through 8 on the control card contain the value ABC\*

- user ID ABC or ABCDEF result in a match
- user ID AB or XABC do not result in a match

### Security considerations

- Users who use the CLIST must have READ access to both the library containing the control member and the library in which the table is located.
- The INCONTROL administrator must have UPDATE access to the library containing the control member.

To produce a diagnostic debug trace of this utility upon request by your BMC representative, execute the following TSO command:

```
CTMJBTINT DEBUG ( "DEBUG" )
```

### Executing the M6 utility as a REXX EXEC

When executed as a REXX executable, the M6 utility contains additional options. These allow additional arguments to be passed for enhanced processing.

```
TSO CTMJBTINT [arg1] [arg2] [arg3]
```

Parameter	Definition
arg1	Specifies whether a debug trace of the REXX should be produced. Such traces need to be produced only when requested by BMC. Otherwise, this parameter should be specified as X=X. Default: NO DEBUG.
arg2	Specifies whether the Job Scheduling Definition should be forced or ordered by specifying YES or NO. Default: ORDER (NO FORCE).
arg3	Specifies an alternate control member that identifies the table the user should utilize. Default: @@USRTBL.

If the default value of the parameter is satisfactory, you do not need to add additional arguments. However, if arg3 is specified, you must also specify arg1 and arg2. Similarly, if arg2 is specified, arg1 is required.

### Example 1

Order the job scheduling definitions selected from the table specified by the @ALTUSR control member:

```
TSO CTMJBTINT X=X NO @ALTUSR
```

## Example 2

Force the job scheduling definitions selected from the table specified by the default control member:

```
TSO CTMJBJNT X=X YES
```

## Example 3

Produce a debug trace when requested by BMC:

```
TSO CTMJBJNT DEBUG ( "DEBUG" )
```

## Activation of Started Tasks

Control-M can activate started tasks as well as jobs. For a description of the JES2/JES3 definitions that are required to support started tasks, see the Control-M chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

When working in a multi-CPU environment, Control-M can also activate started tasks in CPUs other than the one in which the Control-M monitor is active.

Under JES2, the Control-M monitor activates started tasks in other CPUs by using command \$Mm, where m is the appropriate system ID. This system ID is defined in the JES2 initialization parameter one of the following ways:

---

```
MASDEF SID(n)=cccc
```

---



---

```
Sn SID=cccc (under older versions)
```

---

For more details, see the IBM manual JES2 Initialization and Tuning Reference.

JES2 fails a \$Mm command if m is the ID of the system ID in which the Control-M monitor itself is working. Therefore, when Control-M is ordered to activate a started task in a specific system, it determines whether a \$Mm command or a regular MVS START command must be issued. To ensure that this check is performed correctly, all the CPUs in your computer complex must be defined. For specific definition information see Step 6.3 – Specify IOA CPUs, in the Customized installation section of the *INCONTROL for z/OS Installation Guide: Installing*.

Under JES3, the Control-M monitor activates started tasks in other CPUs by issuing a "\*T cccc" JES3 command, where "\*" is the JES3 command prefix and cccc is the required system ID. This system ID is defined in the JES3 initialization deck (INISHDECK) as follows:

---

```
MAINPROC,NAME=cccc,SYSTEM=JES3,...
```

---

For MVS, JES3 command RO cccc is issued.

## Managing the Control-M Application Server (CTMAS)

The Control-M Application Server (CTMAS) communicates with the Control-M/Enterprise Manager, a software product that runs on a UNIX or Windows platform and provides centralized control of the job scheduling environment for the enterprise. The purpose of the Control-M Application Server is to interface between the Control-M/EM and the Control-M environment on the z/OS platform.

### Functions of the Control-M Application Server

The primary functions of the Control-M Application Server are:

- to synchronize the data in the Control-M active environment on the z/OS platform with that on the Control-M/EM server.
- to process user requests received from the Control-M/EM environment and acting on the z/OS data center. Such requests include uploading tables and calendars, ordering jobs, and monitoring job execution.
- to process system requests received from the Control-M/EM environment and acting on the z/OS data center. Such requests include receiving and sending global conditions.

### Activating the Control-M Application Server

The Control-M Application Server is activated by starting the IOAGATE started task that starts the corresponding CTMAS task. To do so, issue the following operator command:

```
S IOAGATE
```

### Deactivating the Control-M Application Server

The Control-M Application Server is deactivated by stopping the IOAGATE started task that starts the corresponding CTMAS task. To do so, issue the following operator command:

```
P IOAGATE
```

### CTMAS Operator Commands

To stop communication between CTMAS and Control-M/EM, issue the following command:

```
F CTMAS.CTMAS001,STOPLINK
```

To establish communication between CTMAS and Control-M/EM, issue the following command:

```
F CTMAS.CTMAS001,STARTLINK
```

To enable or disable trace entries pertaining to CTMAS, issue the following command with the appropriate trace parameters:

```
F CTMAS.CTMAS001,TRACE=(...)
```

For details about usage and parameters, see [Internal Trace facility](#) (on page 178).

## The Download Process

The download process consists of transferring a new image of the Control-M repository to the Control-M/EM server. Data transferred consists of the following files:

- the Control-M Active Jobs File
- the Control-M Resource files
- the IOA Conditions file

Download always takes place following New Day processing by the Control-M monitor. Download also occurs whenever communication with the Control-M/EM gateway is reestablished.

Message CTWH06I in the CTMAS job log signals the completion of the download process. It indicates the confirmation by Control-M/EM that the download was successful.

## Download Job Filtering

Sometimes it is necessary to manually prevent a specific job from being downloaded to Control-M/EM, because the job definition causes problems on the Control-M/EM database or because it caused CTMAS to abend during the previous download. In the latter case, the CTMPARM parameter DWNLDERR can be set to value EMX (the default value) in order to automatically exclude the job from the next download when CTMAS is restarted.

Alternatively, the LOG value can be specified for the DWNLDERR parameter, in which case a message is written to the IOA log indicating which job was being processed at the time of the abend, but the job is not excluded from the next download.

In order to manually prevent a specific job from being downloaded to Control-M/EM, the EMDOWNLD service of the CTMAPI utility can be used to perform such an action. EMDOWNLD provides the following functions:

- EXCLUDE - Exclude job specified from being downloaded to Control-M/EM
- ACCEPT - No longer exclude job specified from being downloaded to Control-M/EM
- EXCLUDE LIST - List all jobs currently excluded from download to Control-M/EM
- ACCEPT ALL - Include all currently excluded jobs in the next download to Control-M/EM

For information on the format of commands using the CTMAPI utility, please see the *Control-M for z/OS User Manual*.

Example 1:

Prevent download of job: Orderid 000DB

---

```
//S1 EXEC PGM=CTMAPI,PARM='EMDOWNLD EXCLUDE OID=000DB'
```

---

Example 2:

Allow download of job: Member name BR14

---

```
//S1 EXEC PGM=CTMAPI,PARM='EMDOWNLD ACCEPT MEMBER=BR14'
```

---

## Managing the CMEM Facility

The Control-M Event manager (CMEM) handles events occurring outside the control of the Control-M monitor. CMEM consists of a monitor that uses the IOA subsystem to perform predefined actions in response to system events (for example, arrival of a specified job on the job spool).

### CMEM and Control-O

If Control-O is installed, the Control-O monitor assumes control of the CMEM facility and performs CMEM functions using its own monitor and subsystem facilities, rendering this description of CMEM irrelevant. Control-O and the IOA subsystem use the same subsystem name. For information about managing the CMEM facility when Control-O is installed, see [Control-O](#) (on page 551).

Before starting Control-O, CMEM must be shut down.

When Control-O is shut down, the CMEM facility is also shut down. To restart Control-O CMEM support after Control-O has been shut down, issue the following operator command (do this only in an emergency situation):

---

```
S  CONTROL0,TYPE=CTOCMEM
```

---

### Activating the CMEM Facility

It is recommended that CMEM be active in every computer in the data center (not just in the computer where the Control-M monitor is working). However, it is possible that in your data center CMEM does not operate in all the computers. (This option is controlled by the Control-M installation parameters.)

The CMEM monitor must operate 24 hours a day. The usual way to ensure this is to automatically initialize the CMEM monitor during the IPL process. For more information, see the Control-M chapter in the *INCONTROL for z/OS Installation Guide: Installing*. To activate the CMEM Subsystem manually, use the operator command

---

```
S  CTMCMEM
```

---

The same operator command can be used to activate the CMEM monitor manually.

### Deactivating the CMEM Facility

Under normal circumstances, the CMEM monitor is not shut down. However, CMEM shutdown may be necessary for the following reasons:

- to resolve a problem that cannot otherwise be resolved

In this case, the monitor must be immediately restored to minimize the impact of the shutdown on the work environment.



- to clean up (erase) all loaded CMEM tables from memory, or stop all CMEM functionality (for example, for a system shutdown)

To stop and immediately restart the CMEM facility, replace the active CMEM monitor by starting a new CMEM monitor. For more information, see [Replacing an Active CMEM Monitor](#) (on page 265).

When the monitor replacement method is not applicable, and a complete shutdown is required, issue one of the following operator commands:

---

```
F CTMCMEM,STOP
```

---



---

```
P CTMCMEM
```

---

CMEM shuts down after a few minutes.

CMEM rules are never triggered for dataset events and step termination events caused by jobs that start when CMEM is down.

## Replacing an Active CMEM Monitor

If a CMEM monitor is currently active, and a new CMEM monitor is started (using operator command S CTMCMEM), the current CMEM monitor passes execution control to the new CMEM monitor and then shuts down. It is not necessary to reload the rule tables. They are passed from the current monitor to the new one. Therefore, to stop and immediately restart the CMEM monitor with minimum interference to ongoing work, issue the following operator command:

---

```
S CTMCMEM
```

---

## Replacing the Active CMEM Executor Modules

When the active CMEM monitor is replaced, most CMEM modules are automatically reloaded. If maintenance is supplied for CMEM executors modules or their messages, a reload command can be used to replace the modules without stopping CMEM.

The following modules can be refreshed:

- CTOWTO, a CMEM executor module
- CTOAIDT, a CMEM executor module
- messages that are used by the above modules

**EXAMPLE:** To replace module CTOWTO, use the operator command

---

```
F CTMCMEM,RELOAD=CTOWTO
```

---

EXAMPLE: To replace the messages used by CTOWTO, use the operator command

```
F CTMCMEM,RELOAD=MESSAGES
```

## Replacing the Active UNIX for z/OS (OpenEdition) Interface Module (CTOAODT)

When the active CMEM Monitor is replaced, most CMEM modules are automatically reloaded. However, the CTOAODT module must be separately reloaded if maintenance is supplied for the Unix for OS/390 (OpenEdition) interface module.

CTOAODT is shared among different IOA environments that are active in the system. Therefore, to replace the module, the current CTOAODT copy must be deactivated in all IOA environments on the system before a new copy can be loaded.

### Deactivating the Current Copy of CTOAODT

To deactivate the current CTOAODT copy in all IOA environments on the system, do the following:

Stop UNIX for z/OS (OpenEdition) support by issuing the following operator command for the CMEM Monitor of every IOA environment on the system:

```
F monitor,STOPOE
```

Alternatively, stop the appropriate monitor.

Wait for the following message to appear:

```
CTO792I OPENEDITION INTERFACE MODULE REMOVED
```

After the CTO792I message has been displayed, UNIX for z/OS (OpenEdition) has been stopped, and the new copy of CTOADT can be loaded.

### Loading the New Copy of CTOAODT

The procedure for loading the new CTOAODT copy in all IOA environments on the system is shown in the following steps:

Load the new module with the following operator command for the CMEM Monitor of the environment in which the PTF was applied:

```
F CMEM,STARTOE
```

Verify that the following message appears:

```
CTO781I OPENEDITION INTERFACE MODULE SUCCESSFULLY LOADED
```

Restore the OpenEdition support in the rest of the IOA environments where it was previously stopped, by running the following operator command for the CMEM Monitor of each one of them:

---

```
F monitor,STARTOE
```

---

Alternatively, restart the appropriate monitor if it was stopped.

## Automatic Restart Management (ARM) and CMEM

The CMEM monitor should not be defined for Automatic Restart Management (ARM) because

- CMEM has its own recovery process
- since CMEM is active on each system, there is no need to move it to another system when the original system becomes inactive.

## Loading Rules

CMEM loads rules in E/CSA. Rules are loaded during CMEM startup under the following conditions:

- it is the first time CMEM is started up
- the operator issues the CMEM modify command C
- a user forces the CMEM rules table from the Tables list of the Control-M Event Manager Rule Definition screen (Screen C)

During the load process, the monitor performs logical checks to verify the correctness of the rule.

In case of an error, the rule is rejected and an error message prints in the IOA Log and the CMEM monitor SYSPRINT.

## Automatic Loading of Rules

When the CMEM facility is started (and is not replacing an active CMEM monitor), it loads CMEM rule tables specified in the CMEM list. The CMEM list is a partitioned dataset (PDS) containing the names of the tables to be ordered. A default CMEM list is located in member IOACMEML in the IOA PARM library (referenced by DD statement DACTMLST). The default list can be overridden by specifying the ORDER parameter in command S CTMCMEM, which references a different CMEM list.

Each line in the CMEM list has the following format:

---

```
*      library table
```

---

where

- \* must be included as a constant
- library is the rule library name
- table is the rule table name (or mask).

## Manual Loading of Rules using the CMEM Online Facility

The CMEM list specified during startup contains a list of rule tables to be activated by CMEM when it is started.

To load additional tables, or to replace a currently active table with a new (updated) copy of the rules in the table using the CMEM facility, enter the CMEM Online facility (=C) and use the FORCE option in the Table List screen.

## Manual Loading of Rules using Operator Commands

Rules are normally loaded automatically, as discussed in "Automatic Loading of Rules." However, manual intervention is possible.

The CMEM list specified during startup contains a list of rule tables to be activated by CMEM when it is started.

To load additional tables, or to replace a currently active table with a new (updated) copy of the rules in the table, issue the following operator command:

---

```
F CTMCMEM,C=library(table)
```

---

where

- C loads a CMEM rule. Each rule is loaded by the CMEM monitor and is activated.
- *library* is the rule library name
- *table* is the rule table name (or mask).

## Example

### Example 1

---

```
F CTMCMEM,C=CTM.PROD.RULES(DATASET)
```

---

Loads table DATASET from CTM.PROD.RULES

### Example 2

---

```
F CTMCMEM,C=CTM.PROD.RULES(*)
```

---

Loads all tables from CTM.PROD.RULES

### Example 3

---

```
F CTMCMEM,C=CTM.PROD.RULES(PROD*)
```

---

Loads tables whose name starts with PROD from CTM.PROD.RULES

## Replacing All CMEM Rule Tables in One CPU

To replace all loaded CMEM tables with those in the CMEM list (referenced by DD statement DACTMLST), use the following operator command:

```
F CTMCMEM,C=ALL[,REBUILD]
```

If the REBUILD option is specified, CMEM rule tables not listed in the CMEM list are deleted.

If the REBUILD option is not specified, previously loaded CMEM rule tables are replaced by a new copy of the rule table, and unchanged tables are left intact.

## Replacing All CMEM Rules Tables in All CPUs

All CMEM rules in all the CPUs where the CMEM monitor is active can be reloaded at the same time. The reload process is performed in the same way as the automatic loading is performed during startup of the CMEM monitor. All active rules are deleted, and all rule tables specified in the CMEM list referenced by DD statement DACTMLST are loaded.

To replace all rules in all the CPUs issue the following command:

```
F CONTROLM,NEWCONLIST
```

Specifying this command is the same as specifying `F CTMCMEM, C=ALL,REBUILD` in all CPUs.

Control-M informs the CMEM monitor running in each CPU about this command request.

Rule tables that were manually loaded and/or are not in the CMEM list are deleted during execution of this operator command.

## Deleting (Deactivating) an Active Rule Table

An active CMEM rule table can be manually deactivated using the following operator command:

```
F CTMCMEM,D=library(table)
```

where

- D deactivates a CMEM rule table. Each rule is deactivated by the CMEM monitor
- *library* is the rule library name
- *table* is the rule table name (or mask)

Example

```
F CTMCMEM,D=CTM.PROD.RULES( PRODTAB1 )
```

## Displaying Active Rules

A list of the active CMEM rules (up to a maximum of 1000 rules) can be displayed on the operator console. To display the list, enter the operator command

F CTMCMEM,DISPLAY

This command displays a list of all active rules in the CMEM facility with the following information:

**Table 106 Information Listed when Displaying Active Rules**

Field	Description
Rule	Rule name (that is, the name in the first ON statement of the rule definition).
Type	Rule type. Valid types: <ul style="list-style-type: none"> <li>▪ R - JOBARRIVAL</li> <li>▪ x - JOBEND</li> <li>▪ D - DSNEVENT</li> <li>▪ Z - STEP</li> </ul>
Table	Name of the table containing the rule.
Status	Rule status. Valid status is ACTIVE.
Library	Name of the library containing the rule member.
Priority	Internal CMEM rule scanning priority.

## Controlling CMEM Rule Operation Mode

The mode of operation (the trace mode) for a CMEM rule is determined by parameter MODE in its rule definition. Sometimes it is useful to override the operation mode of all active rules and verify that events and actions are recorded in a particular way. For example

- Ensure a trace of all rules (that is, all events and actions are recorded) to facilitate analysis of the interaction between rules.
- Record (trace) only the triggering of every rule.

Global trace operations are requested using operator commands, as follows:

Activate a complete trace by issuing the following command:

```
F CTMCMEM,LOG=ALL
```

All rules are fully traced as if they were defined with mode LOG. This operator command must only be used temporarily for specific tests, because extended use of LOG mode can adversely affect CMEM performance.

Trace rule triggering only by issuing the following command:

```
F CTMCMEM,LOG=TRIGGER
```

Only rule triggering is traced for all rules. However, rules defined with mode LOG are fully traced.

Restore the default operation mode (as defined in the rule definition) for each rule by issuing the following command:

```
F CTMCMEM,LOG=DEFAULT
```

## Modifying the CMEM Sleeping Interval

CMEM "wakes up" every few seconds. This time interval is defined using the Control-M installation parameters and can be changed by the INCONTROL administrator. In addition, the interval can be modified with the operator command

```
F CTMCMEM,INTERVAL=nn
```

where *nn* represents the interval in seconds.

When the modification is accepted by CMEM, the following message is displayed on the operator console:

```
CTO123I CMEM INTERVAL IS SET TO nn SECONDS
```

## Refreshing the CMEM Security Cache

CMEM security modules use a security block to identify each user for which an authority check is performed. The first time a user's security authorization is checked, CMEM creates a security block for that user. The security block can then optionally be saved for the next time the user's security authorization is checked. Security blocks saved for subsequent checks are kept in the CMEM security cache.

The CMEM security cache holds security blocks for the last 30 users whose security authorization was checked.

Changes made to a user's security authorization (since the last time that the user's security block was created) are not automatically included in the user's security block in the CMEM security cache. However if a user's security authorization has been changed, and there is no security block in the CMEM security cache for that user, changes made to the user's security authorization is in effect the next time the user's security authorization is checked.

To immediately include new user authorization information in the CMEM security cache, refresh the security cache using the following operator command:

```
F CTMCMEM,NEWSECDEF
```

This command refreshes all user authorization information in the CMEM security cache.

When the modification is accepted, the following message is displayed on the operator console:

```
CTO251I RUNTIME SECURITY REFRESH ENDED OK
```

## Private REGION Requirements of the CMEM Monitor

CMEM monitor procedure CTMCMEM is supplied with a default region size of 5 MB. The region size can optionally be increased to a maximum of 2 GB.

### Calculating Region Size

Include the following items in your calculation of the amount of virtual storage needed by the CMEM monitor:

- block size of the IOA Conditions file (fixed at 32,760)  
The storage chunks allocated for this requirement are above the 16 MB line.
- CMEM monitor working buffers require approximately 6500 K of virtual storage. The storage chunks allocated for this requirement are mostly above the 16 MB line.
- CMEM monitor software requires approximately 2000 K of virtual storage, depending on the environment and the functions used. The storage chunks allocated for this requirement are both above and below the 16 MB line.
- site-defined work areas and programs (for example, user exits)  
These items usually require a small amount of virtual storage. Therefore, it is usually not necessary to calculate the requirements of site-defined components precisely. However, it is important that you allow some extra storage space for these components. The storage chunks allocated for this requirement are both above and below the 16 MB line.

You should specify a larger than necessary region size to ensure sufficient storage space for CMEM and related MVS activities.

A site has the following:

- IOA Conditions file block size of 32760
- 32 slots per block (CNDREC#)
- site-defined components requiring approximately 0.20 MB of virtual storage

Calculate virtual storage for the CMEM monitor as follows:

**Table 107 CMEM Monitor Virtual Storage (Below the 16 MB Line)**

Component	Size	Comments
CMEM software	1.00 MB	
CMEM working buffers	1.00 MB	
Site-defined components	0.20 MB	
Extra space for MVS activities	0.20 MB	
Total	2.40 MB	



**Table 108      CMEM Monitor Virtual Storage (Above the 16 MB Line)**

Component	Size	Comments
IOA Conditions file	34.00 MB	(32,760 * 32 days * 32 slots per record) + 64K
CMEM software	1.00 MB	
CMEM working buffers	5.50 MB	
Site-defined components	0.20 MB	
Extra space for MVS activities	0.20 MB	
Total	40.90 MB	

## Troubleshooting

MVS allocates the region size specified for the CMEM monitor unless a local exit (for example, IEALIMIT, IEFUSI, or another MVS or JES exit) is used to limit the region size of jobs and/or started tasks at the site.

Depending on the value of the REGION parameter in the EXEC DD statement, some MVS versions determine and calculate the amount of the allocated region above the line. In case of doubt, see the REGION parameter of the EXEC DD statement in the JCL Reference Guide for your operating system level.

Message IEF374I in the third SYSOUT of the CMEM monitor indicates the amount of virtual storage used by the CMEM monitor. Compare the information in this message with the existing region size definition.

If sufficient virtual storage is not available for the CMEM monitor, use on-site performance tools to determine if the specified region size was rejected by MVS (for example, using a local exit).

- If MVS accepted the specified region, recalculate the CMEM monitor's virtual storage requirements, as shown above, and modify the region size in the EXEC statement of the CMEM monitor procedure accordingly.
- If an MVS procedure rejected the specified region size, consult your system administrator.

## Storage Allocation

At startup, the CMEM monitor allocates working storage. CMEM can allocate most virtual storage above the 16 MB line. MVS (which considers the specified job, the amount of requested storage, MVS exits, and so on), determines whether to allocate above or below the 16 MB line.

## Structure of the IOA Conditions File

For information about the structure and space requirements of the IOA Conditions file, see the section that discusses the structure of the IOA Conditions File in the *INCONTROL for z/OS Installation Guide: Installing*.

## CMEM Usage of the Common Service Area (CSA and ECSA)

CMEM receives control for processing events under the various tasks in the system, that is, CMEM acts as part of the address space that issued the corresponding message, command, or other event. For that reason, some of the code and data that are in use by CMEM reside in common storage, accessible from all address spaces, as outlined below. Most of this common storage is above the 16MB line, in the ECSA, but a small portion is allocated by CMEM below the 16MB line, in the CSA, due to MVS services requirements.

Use the information in the following tables to calculate CMEM ECSA and CSA storage requirements:

**Table 109 CMEM's Usage of ECSA Storage Above the 16 MB Line**

Item	Size	Comments
Subsystem executor	250 K	
Work Buffers	480 K	The CMEM monitor allocates 20 work buffers of 24K each, in internal control blocks called WSCs.
Rules	50 K	This amount assumes 500 rules and an average of 100 bytes per rule.
XES Preallocated Buffers	3000 K	Preallocated buffers for XES operations.
Total	3780 K	

**Table 110 CMEM's Usage of CSA Storage Below the 16 MB Line**

Item	Size
SWT and other system control blocks	1.5 K
Dataset triggering executor	30.0 K
UNIX for z/OS interface (USS)	30.0 K
Total	61.5 K

## CMEM—Control-M Communication

The Control-M installation chapter of the *INCONTROL for z/OS Installation Guide: Installing* describes the installation and implementation of the two methods used by the Control-M Event Manager (CMEM) to communicate with Control-M. These methods are

- subsystem-to-monitor (S2M) communication files
- MVS System Logger Sysplex interface

For a description of the advantages of the MVS System Logger Sysplex interface, see the Control-M chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

The following topics discuss the coupling facility, the coupling facility resource manager, and the MVS System Logger Sysplex interface.

## Coupling Facility and Coupling Facility Resource Management

A coupling facility is a shareable storage medium (not a shared storage device) that facilitates high-speed access to shared data across applications and subsystems running on the same or different MVS systems.

A coupling facility can be shared by the systems in one Sysplex only. It enables data to be shared by all users in a Sysplex while ensuring data integrity and consistency. To share data, systems in the Sysplex must be connected to the coupling facility using coupling facility channels and must have access to the coupling facility resource management (CFRM) couple dataset.

Storage in a coupling facility is divided into distinct objects called structures. Structures are used by authorized programs to implement data sharing and high-speed serialization. Structure types are cache, list and lock, each providing a specific function to the application. MVS System Logger is a set of standard services that allows an application to write to, browse in, and delete from a coupling facility structure or linear dataset.

A coupling facility is managed using the coupling facility resource management (CFRM) policy. The CFRM policy allows a user to specify how a coupling facility and its resources are to be used at the site. In a CFRM policy, a user supplies information about each coupling facility and each coupling facility structure at the site. For information on planning a CFRM policy, see the IBM manual *MVS Setting Up a Sysplex*.

Perform the following steps to set up a CFRM policy:

1. Format a CFRM couple dataset by using the IXCL1DSU format utility program. For more information, see the IBM manual *MVS Setting Up a Sysplex*.
2. Define one or more CFRM administrative policies by using the IXCMIAPU administrative data utility. For more information, see the IBM manual *MVS Setting Up a Sysplex*.
3. Make one of the defined CFRM policies the active administrative policy for the Sysplex. Start it by using operator command SETXCF START,POLICY,TYPE=CFRM. For more information, see the IBM manual *MVS Setting Up a Sysplex*.

## MVS System Logger Sysplex Interface

MVS System Logger is a robust set of standard MVS services that allows an application to write to, browse in, and delete from a coupling facility structure or linear dataset. This set of MVS services has been chosen to implement Control-M Event Manager (CMEM)—Control-M communications and to replace the subsystem-to-monitor communication files. The write, browse and delete functions of the MVS System Logger are tailor-made for CMEM 'writing' to the coupling facility and Control-M 'reading' from the coupling facility.

Perform the following steps to install and implement the MVS System Logger Sysplex interface:

Follow the instructions to set up a CFRM policy (summarized above).

- Specify CMEM Sysplex configuration parameters—CMMPLEX. For details, see the Control-M chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

For a discussion of the advantages and other implementation-related details of the MVS System Logger Sysplex interface, see the Control-M chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

## Problem Determination

If the CMEM facility is not functioning correctly, you can try the following methods to determine what the problem is:

- [CMEM Internal Trace](#) (on page 276)
- [CMEM Diagnostic Tests](#) (on page 279)

## CMEM Internal Trace

CMEM is supplied with the following internal trace facilities:

- the ability to print an internal trace
- the ability to print the contents of the CMEM internal data areas

Under normal circumstances, the debugging facilities are dormant. However, if required (that is, your BMC Customer Support has requested trace information), it is possible to activate the trace facilities as follows:

Perform either step 1 or 2 below.

1. Start a new CMEM monitor with the following operator command:

```
S CTMCMEM,TRACE=nn
```

The current CMEM monitor passes control to the new CMEM monitor and shuts down.

2. Issue the following operator command:

```
F CTMCMEM, TRACE=level
```

The required tracing level is supplied by BMC Customer Support. It can be any value from 000 to 255. (000 specifies no trace.)

**Table 111 Trace Levels for the CMEM Internal Trace Facility**

Field	Description and Options
level	<p>Trace levels to be activated or deactivated. The CMEM Internal Trace facility has 128 levels (that is, from 1 through 128). Any number of these levels can be on at a given time. Valid values:</p> <p><math>x</math> - Trace level to turn on</p> <p>EXAMPLE: TRACE=3 turns on trace level 3.</p> <p><math>-x</math> - Trace level to turn off</p> <p>EXAMPLE: TRACE=-3 turns off trace level 3.</p> <p><math>(x:y)</math> - Range of trace levels to turn on, where <math>x</math> is the first level in the range and <math>y</math> is the last level in the range.</p> <p>EXAMPLE: TRACE=(1:10) turns on trace levels 1 through 10.</p> <p><math>(-x:-y)</math> - Range of trace levels to turn off, where <math>x</math> is the first level in the range and <math>y</math> is the last level in the range.</p> <p>EXAMPLE: TRACE=(-1:-10) turns off trace levels 1 through 10.</p> <p><math>(x,y,z,...)</math> - Multiple trace levels to turn on.</p> <p>EXAMPLE: TRACE=(3,5,29) turns on trace levels 3, 5 and 29.</p> <p><math>(-x,-y,-z,...)</math> - Multiple trace levels to turn off.</p> <p>EXAMPLE: TRACE=(-3,-5,-29) turns off trace levels 3, 5 and 29.</p> <p>SHOW - Shows the current status of all trace levels.</p>

Avoid activating CMEM with the TRACE parameter on a regular basis, because if a JES problem occurs, CMEM may get hung up waiting for JES.

- The trace information is printed to DD statements DATRACE and DADUMP of the CMEM procedure. If you are running a trace on the Subsystem Interface (SSI), start the General Trace Facility (GTF).
- When you have finished your problem determination procedures, start a new CMEM using the either of following operator command:

```
S CTMCMEM
```

```
F CTMCMEM,TRACE=00
```

### Print CMEM Internal Data Areas

To print CMEM internal data areas, issue the following operator command:

```
F CTMCMEM,SNAP[=name1,name2 . . . ,namen]
```

where *name1*, *name2*,... *namen* are the names of the CMEM internal data areas.

When no name is specified, all data areas are printed. Your BMC Customer Support can provide the list of data area names. Which data areas are printed depends on the problem encountered:

**Table 112 Valid Data Area Names**

ALL	ALO	CAS	CONLIST	CONS
CONSOLE	DLY	EXO	LINK	MAIN
MCT	MTO	MTOINX	MTOLNK	MTOMIX
MTOMPT	MTOPLB	MTOPND	MTOPNX	MTOSRV
MTOSRVA	MTOWSC	MVS	OMT	OPR
PARM	PND	RFR	RQCALO	RQCDLY
RQCEXO	RQCFREE	RQCMTO	RQCRFR	RQCSLO
RQCSRV	RQCSTO	RQC	RQH	RULES
SEC	SLO	SRV	SSCT	SSVT
STO	SWT	UCM	VARS	WISHES
WSC				

When the snap is completed, the following message is displayed on the console:

```
CME150I SNAP COMMAND WAS PERFORMED SNAPID=xxxx
```

where *xxxx* is the snap identifying number that is displayed at the lower right of the screen after the snap is completed.

## Displaying Internal Resource Utilization Statistics

To obtain statistical information on internal resource utilization, issue the following operator command:

```
F CTMCMEM,USAGESTATS[=type]
```

In this command, *type* designates the type of a specific internal resource.

Valid values for *type* in this command are RQC, PND, and WSC. When ALL is specified as a resource type, or when the parameter is omitted, information regarding all the above resource types is displayed.

The following is a typical sequence of messages displayed when this command is issued:

```
CTO356I USAGESTATS
```

```
CTO15EI RQC USAGE: CURRENTLY 1%, HIGHEST 1% (000001 AND 000019 OUT OF 010000)
```

```
CTO15EI PND USAGE: CURRENTLY 0%, HIGHEST 0% (000000 AND 000000 OUT OF 000011)
CTO15EI WSC USAGE: CURRENTLY 0%, HIGHEST 10% (000000 AND 000002 OUT OF 000020)
CTO357I COMMAND ENDED SUCCESSFULLY
```

For more information about these messages, see the *INCONTROL for z/OS Messages Manual*.

CMEM users can tune the PND and WSC by adjusting the values of the WAITPR# and WSCs# parameters in the CMMPARM member. However, the RQC cannot be tuned. Look for any PTFs that correct problems handling RQC.

## CMEM Diagnostic Tests

This section describes basic tests for locating installation problems in the Control-M CMEM facility.

The CMEM facility requires the proper setup and functioning of the following major components:

- the Control-M monitor (started task CONTROLM)
- one or more CMEM monitors (started tasks CTMCMEM). One CMEM monitor is normally required per CPU
- the Monitor-to-Subsystem file (M2S). This file passes requests from the Control-M monitor to the CMEM monitors
- Subsystem-to-Monitor communication. Communication is established either through (S2M) files or the Sysplex Logger function

This communication passes requests from the CMEM monitors to the Control-M monitor. Using the file method, one Subsystem-to-Monitor (M2S) file is required for each CPU. The files are required if the Sysplex Logger is not in use.

Perform the tests only after the CMEM has been fully installed. Corrections to installation parameters can be made either manually in the corresponding members, or by using ICE.

### 1. Before testing, check that

- parameters in member IOACPRM describe all CPUs in the complex, in addition to the names of the communication files or Logger structure
- each communication file is uniquely named
- either the communication files between the monitor and the subsystems have been allocated and formatted, or the Logger structure was allocated before the first CMEM or Control-M

This attribute is only available for Control-O monitor starts.

- an appropriate CMEM rule has been created, and either manually or automatically ordered by the CMEM monitor

The most basic diagnostic test is to define a CMEM rule table so that when a certain job enters the system (that is, it is displayed on the reader), a condition is added for the same ODAT. For this basic test, it is recommend that you define a specific job name (do not use generic names with asterisks).

An additional test is to define a CMEM rule table so that when a certain job enters the system (that is, it is displayed on the JES internal reader), a schedule table is ordered. For this test, the scheduling definition should contain one simple job definition.

- the subsystem has been defined in SYS1.PARMLIB in all CPUs where CMEM must work (or SSALLOC=Y has been specified in member IOAPARM)
- all provided fixes from BMC (with regard to CMEM functions) have been applied
- if DSNEVENT or step events are to be monitored, the MN JOB NAMES,T or SETCON MN,JOB NAMES=(ON,LOG),T=ON (in z/OS 1.8 and above) command is active (using the CONSOLxx parameter or an operator command)
- if DSNEVENT or step events are to be monitored, the MSGLEVEL parameter of all jobs, started tasks, or TSUs to be monitored contain the value 1

For details about installation requirements to activate CMEM, see

- the *INCONTROL for z/OS Installation Guide: Installing*
- the *INCONTROL for z/OS Security Guide*
- the JCL and AutoEdit facility chapter in the *Control-M for z/OS User Guide*

For information on changing CMEM-related parameters, see the *INCONTROL for z/OS Installation Guide: Installing*.

2. Stop the CMEM monitors (if active) in all CPUs, using the following operator command:

```
F CTMCMEM,STOP
```

3. If member IOACPRM was corrected, stop and restart the Control-M monitor.
  - Before restarting the Control-M monitor, remember to refresh any program fetch product (PDSMAN, PMO, QFETCH, and so on). If the IOA LOAD library was added to the linklist, refresh LLA also.
  - When the Control-M monitor comes up, it must issue the message CTM440I monitor ready to receive CMEM requests. If this message was not issued, search for error messages within
    - the IOA Log
    - the job log of Control-M monitor SYSOUT
    - the MVS syslog
  - If no error message is displayed, IOACPARM does not request CMEM processing to be performed. This means that one of the following was not specified:
    - parameter CPUS
    - parameter CTM2SBS in conjunction with parameter Use System Logger set to N (No)
  - If an error message is displayed, it means that Control-M encountered an error while processing CMEM-related parameters. Locate the problem, correct it and restart the Control-M monitor.
4. Start CMEM in all CPUs where it must run by issuing the following operator command in each CPU:

```
S CTMCMEM
```

If CTMCMEM successfully initialized, the following messages appear in the CTMCMEM job log:



---

**CTM227I IOA subsystem "I600" initialization of Control-M functions completed.**

**CT0147I CTMCMEM - initialization complete. Type=CTMCMEM, SUB=JES2, RUN#=0001**

---

- If the above messages do not appear in the job log, search for error messages within the CTMCMEM job log and the MVS system log (SYSLOG) in general.
  - While searching, note that all related messages start with a prefix of CTM, CME, or IOA. An error message number usually contains the suffix E (Error) or S (Severe error).
  - Locate the problem, correct it and restart CTMCMEM. If the problem correction includes changes to member IOAPARM, CTMPARM or IOACPARM, return to step 1 above.
5. Submit a test job to evaluate whether CMEM as a whole functions properly. You should perform the basic test described in 1 on page 327.
- The job must be submitted from TSO or ROSCOE in one of the CPUs in which the CMEM monitor is active, and must have the exact name as defined in the CMEM rule table.
  - After message HASP100 (for JES2) or IAT6101/IAT6100 (depending on the JES3 version) is displayed, wait a few seconds and check if the action defined in the CMEM rules table was performed for
    - a request to order a schedule table, check the IOA Log and the Active Environment screen (Screen 3)
    - a request to add or delete a condition, check the IOA Log and the IOA Conditions or Resources Display (Screen 4)
    - The action is actually performed by the Control-M monitor, so to test the CMEM functions properly the Control-M monitor must be up.

Note: IOA Exit 7 and Control-M Exit 1 receive control before the condition is added or deleted or the table is ordered (respectively). If you use a localized version of these exits, make sure that the exits perform the localized corrections.

- Repeat this step for all CPUs in which the CMEM monitor is active. If the requested action was not performed by Control-M, skip to step 8 below.
6. Change the definitions in the CMEM Rule table, or add new events. Define events to test all event types: JOBARRIVAL, JOBEND, DSNEVENT and STEP. For information on changing the CMEM Rule table, see the online facilities chapter of the *Control-M for z/OS User Guide*.
7. Issue the operator command `F CONTROLM,NEWCONLIST` to cause CMEM to reload the updated CMEM Rule tables in all CPUs.

This command must be issued only in the CPU where the Control-M monitor is active. It must be issued each time that the CMEM rule tables are modified, and can also be issued to test if the Control-M monitor and the CMEM monitors communicate with each other.

The command is directed to the Control-M monitor. After several seconds, the monitor must issue the message

---

**CTM101I NEWCONLIST COMMAND ACCEPTED . . .**

---

After several more seconds, the CMEM monitors must issue the message

---

**CTO240I NEWCONLIST COMMAND RECEIVED. THE CMEM TABLES WERE RELOADED**


---

- If the CMEM monitor encounters a problem while performing the NEWCONLIST request, an error message is issued to the job log instead of message CME240I.
  - If the CMEM monitor does not issue any message at all, the communication files between the Control-M monitor and the CMEM monitors or Sysplex Logger were not set up correctly. Locate the error and correct it. If the correction involves changes in IOACPRM or a reformat of the communication files, repeat the test from step 1 above.
- 8.** Submit jobs to test all the event types as defined in step 5 above.
- These jobs must be submitted from TSO or ROSCOE in one of the CPUs where the CMEM monitor is active. They must run in the same CPU, and must have the exact names as defined in the CMEM Rule table.
  - Check that the actions defined in the CMEM Rule table are performed (the condition was added or deleted, a schedule table was ordered, and so on).
  - Repeat this step in all CPUs where a CMEM monitor is active.
  - After all jobs ended execution, wait a few seconds and check if the action defined in the CMEM rules table has been performed for
    - a request to order a schedule table, check the IOA Log and the Active Environment screen (Screen 3)
    - a request to add or delete a condition, check the IOA Log and the IOA Conditions/Resources screen (Screen 4)
    - a request to stop the job, check the job log of the executed job for messages CTMC41E and CTMC42E
  - If the action for a DSNEVENT or step event is not performed, verify that
    - the MN JOBNAME,S,T or SETCON MN,JOBNAME=(ON,LOG),T=ON (in z/OS 1.8 and above) command is in effect in all CPUs where CMEM is active (check for message IEF403I in the job log of the tested jobs)
    - the MSGLEVEL of the tested jobs is set to (x,1); that is, the JESYSMSG sysout file (the third file listed in the sysout) is created with all the deallocation messages
    - no error messages appear in the job log of the executed job
  - If one of these situations cannot be verified, locate the problem, correct it and repeat this step.
  - If these situations can be verified, or if actions for JOBARRIVAL/JOBEND were not performed, continue to the next step.
- 9.** If CMEM does not work properly, and the reason for the error was not located while performing the steps mentioned so far, produce and save the following documentation:
- a.** Create a dump of the subsystem communication files (Monitor-to-Subsystem file, and all Subsystem-to-Monitor files). The dump can be created using utility IDCAMS, with the following statements:
- ```
PRINT IFILE(ddname1) DUMP (subsys-to-monitor file)
PRINT IFILE(ddname2) DUMP (monitor-to-subsys file)
```
- A sample JCL member can be found in member LISTFILE of the IOA JCL library.

- b.** Save the part of the MVS syslog that contains the entire test.
- c.** Print the rule table.
- d.** Save the IOA log of the entire test. If the IOA log is printed using KSL or Screen 5, use the SHOW command and specify Y in all CM and CO+CMEM options before printing the log.
- e.** Print members CTMPARM, IOAPARM and IOACPRM in the IOA PARM library.

After saving this documentation, contact your BMC Customer Support with an exact description of the problem.

## Managing the CMEM Facility – System Logger Recovery

If the Control-M Event Manager (CMEM) communicates with Control-M via the MVS System Logger Sysplex interface, it is possible that one or more of several software and hardware components can fail and may require periodic maintenance. Some of these possibilities are described below.

### Unplanned Outages

The MVS System Logger is a comprehensive facility for handling communication across the Sysplex. The System Logger is meant to be treated as a black box, providing automatic recovery support if the system, Sysplex, or Coupling Facility structure fails. The *z/OS MVS Assembler Services Guide* discusses in detail the various components that can fail. Among the failures discussed are:

- MVS system failure
- system logger address space failure
- coupling facility (CF) structure failure
- log stream or staging data set filling up
- damaged log stream
- DASD I/O error

The system logger and MVS initiate automatic recovery of many or most of the failures. It is recommended for users to read this section before using the system logger for communication between CMEM and Control-M.

Depending on the particular failure, the interface between CMEM and Control-M will either:

- retry the request
- rebuild the system logger environment (re-connect) and retry the request
- disable the CMEM facility

For example, the following errors cause the interface to reconnect to the system logger address space:

- severe XES error (error code 802)
- stream token not valid (error code 806)
- stream token not valid—expired (error code 82D)
- rebuild in progress (error code 861)
- no connectivity (error code 864)
- staging data set being formatted (error code 868)
- system logger address space initializing (error code 891)

## Planned Outages

In most customer sites, if the coupling facility (CF) must be brought down for maintenance, a CF structure must be moved. If other CF-related planned outages must occur, the system (including all production jobs and system address spaces) is brought down. If the customer site does not want to bring their system activity to a halt, we recommend temporarily switching the interface between CMEM and Control-M, meaning both CMEM and Control-M, to use the communication files. Assuming the IOACPRM PARM member is updated with the system IDs, system names, and the communication file names, this involves a simple change from SYSTLOGR=Y to SYSTLOGR=N and the recycling of CMEM and Control-M.

If CF system maintenance is attempted without switching over to the communication files, CMEM will not be able to write to the system logger and CMEM events will be lost. CMEM does not queue, save, and retry CMEM events in this case. Also, Control-M will not be able to read from the system logger and eventually the CMEM facility will be disabled.

The interface between CMEM and Control-M assumes a healthy and stable system logger environment. If this is not the case, the customer site should use the communication files instead of the system logger interface.

## Considerations and Notes

For detailed explanations about what to do when a CMEM-related parameter is changed, see the *INCONTROL for z/OS Installation Guide: Installing* and *INCONTROL for z/OS Installation Guide: Maintaining*.

- The CMEM-related parameter member is member IOACPRM in the IOA PARM library.
- The CMEM subsystem is triggered by the following messages:
  - IEF403I - Job started.
  - IEF125I - TSO user logged on.
  - \$HASP100 (under JES2), IAT6101/IAT6100 (under JES3) - Job on header.
  - \$HASP395, \$HASP001 (under JES2), IAT6108, IEF404I, IEF450I
  - IEF453I (under JES3) - Job ended
- These messages must be issued for all jobs. However, if these messages must not be displayed on the console, they can be suppressed using member MPFLSTnn in the SYS1.PARMLIB library.

## Supporting Interfaces

### General Considerations for Third Party Product Interfaces

To prevent insufficient region abends, file integrity problems, and false AJF-full conditions

- exclude IOA and Control-M files from any third party buffering or caching products such as DLF, HIPER-CACHE, Ultimizer, Startpool, Batch Optimizer (MVBO), and so on.
- exclude the Control-M Active Jobs file from any third party blocksize optimization products like CA-Optimizer, and so on.
- exclude Control-M files and the IOA Conditions file from disk volumes under DFSMS control on which the partial release attribute has been defined.

### CDAM Files

Control-M attempts to use the unused space on Compressed Data Access Method (CDAM) files. Therefore, the unused space on CDAM files must not be released by any product that releases unused space (for example, products that perform disk defragmentation).

If CDAM files are allocated on SMS volumes, these volumes must be defined with PARTIAL RELEASE=NO.

### GRF File Considerations

Sometimes the GRF file is not used to its full capacity. The DASD management software installed at your site must therefore be instructed not to release any unused space from the GRF file.

### HSM Migrated Files

JCL libraries, which the Control-M Monitor requires for job submission, may be migrated.

When the Control-M Monitor detects such a situation, it attempts to recall the libraries asynchronously, and temporarily bypasses processing the job. The monitor later retries to process the job again governed by the parameters INUSE#RT and INUSE#WI, where INUSE#RT is the number of retries which are attempted and INUSE#WI is the interval between retries. For details about these parameters, see the chapter about customizing INCONTROL products in the *INCONTROL for z/OS Installation Guide: Customizing*.

## Control-M Monitor and JES

### Cases of JES Malfunction

The Control-M monitor uses JES services to receive information about the status of the jobs running in the system. If Control-M detects a critical error in JES operation, it shuts itself down. This precaution prevents incorrect submission of jobs due to a JES malfunction. In this case, one of the following highlighted, unrollable messages is displayed on the operator console:

---

**CTM168S Control-M SHUTTING DOWN - COMMUNICATION TO "JES" NOT AVAILABLE**  
**CTM256S Control-M SHUTTING DOWN - COMMUNICATION TO "JES" NOT AVAILABLE**

---

At certain times when the JES subsystem is shut down, especially when doing a hot start, Control-M does not detect that JES was shut down. To avoid incorrect submission or post-processing of jobs, deactivate Control-M prior to shutting down JES and bring it back up after JES is brought back up.

## Special Considerations

Control-M uses JES services to read the job's output. This is how Control-M analyzes how the job finished executing. It is important to remember the following limitations:

- Jobs submitted by Control-M can be canceled by the operator. It is important, however, not to purge their outputs. Therefore JES commands \$PJnnn, \$CJnnn,P and similar commands must not be used.
- Job output for jobs submitted by Control-M must not be released for printing except by Control-M. Therefore, do not activate MVS JES2 command \$TO and similar commands on the job's output. Ensure that output management products (such as CA-View, CA-DISPATCH) do not remove a job's output from the spool until Control-M has first analyzed the output.
- If JES operator command \$HJ is issued for the job, the job must be released from held status before Control-M can read the job's output. Otherwise, the job status is changed to EXECUTING (SYSOUT IN HOLD STATUS).

If the Control-M monitor cannot read a job's SYSOUT, the following message is displayed on the operator console:

---

**CTM262Wn UNSUCCESSFUL ATTEMPTS TO READ JOB DATA BY SUBSYSTEM REQUEST. RETRY CONTINUES**

---

Message CTM262W does not necessarily indicate a serious problem.

## Examples

- When a job is not run due to a JCL error, only two SYSOUT datasets exist for the job. Therefore, Control-M cannot read the expected third SYSOUT dataset, and the above message is displayed.
- When JES is very busy, a period of up to a minute (in extreme cases) may pass between the time the job has finished executing and the time JES enables Control-M to read its SYSOUT (in other words, JES is "stuck" in the output processing stage).

By default, CTM262W is displayed every 5 times the Control-M monitor attempts to read the job SYSOUT and does not succeed. If after 20 attempts the Control-M monitor still cannot read the SYSOUT, the following message is displayed:

```
CTMD50S  READING JOB DATA BY SUBSYSTEM REQUEST FAILED AFTER n ATTEMPTS.
LAST RC rc FILE filename jobname/jobid
```

These two default values can be changed using installation defaults.

On the other hand, message CTM262W can indicate serious problems with the job's sysout. The following problems can cause this message to be displayed:

- When a job's output is released for print (that is, the job's output is no longer held), the job's output must be printed or purged.
- In a multicomputer environment, the following chain of events can occur:
  - Control-M monitor submits the job from computer A.
  - Computer A crashes (or is shut down).
  - Control-M monitor is activated on computer B and the job executes in computer B. When the job finishes executing, Control-M cannot read the job's output, and message CTM262W is displayed.

This is caused by the job waiting to be "handled" by the JES of computer A.

This problem can be overcome by assigning the job to computer B using JES command \$TJnnn,S=sysid. Control-M then reads the output, and the message is removed from the operator console.

### Message CTM262W Summary

Whenever message CTM262W is displayed, wait one or two minutes. If the message continues to be displayed every few seconds for the same job, perform the following steps:

Note: To stop the message from being displayed on the operator console while you are checking the problem, hold the job order in the Control-M Active Environment screen (Screen 3). Release it when you have resolved the problem.

1. Issue JES2 commands \$DJnnn and \$LJnnn, and scan the results.
2. Check if the job's output is in held class (the job waits for print). If it is, the Control-M monitor cannot analyze the output, so you must analyze it manually. Print or purge the output of the job. Make sure that the job order in Control-M is not HELD. Wait about a minute until the status of the job changes to DISAPPEARED. Manually add or delete prerequisite conditions according to the result of the run using the IOA Conditions/Resources screen (Screen 4).

To stop the message from being displayed on the operator console while you are checking the problem, hold the job order in the Active Environment screen. Remember to release it once you have resolved the problem.

3. If the job is "waiting for output processing," check if the job (not the output) is held (by a previously issued \$HJ command). If the job is held, release it using JES2 command \$AJnn.
4. If the job is "waiting for output processing" by a system ID that is currently not active, try to resolve the problem using JES command \$TJnn.

### Stopping CMEM Before JES Is Stopped

Before shutting down the JES subsystem, deactivate CMEM using the command

---

```
P CTMCMEM
```

---

If this is not done, warning messages (about OPEN DEBs) are issued. Under some conditions, these messages may be followed by an SC03 abend in JES. This does not cause any harm, since JES has finished all of its processing at this time.

After JES is brought up, restart CMEM using the command

## Controlling Unix for z/OS (OpenEdition) Support

z/OS has introduced major changes and enhancements to the UNIX for z/OS (OpenEdition) environment to make it part of the MVS core. Consequently, certain applications, such as IBM and FTP, were converted to use the USS (Unix Services for z/OS). As a result, IBM stopped issuing allocation and deallocation messages to the JESYSMSG spool dataset.

CMEM provides a special interface to support dataset-triggering events originating from UNIX. CMEM automatically determines if the UNIX for z/OS interface must be installed and no user action is required.

The UNIX for z/OS interface is shared by all CMEM installations at the site and is version-independent. The first CMEM subsystem to initialize loads the Unix for OS/390 interface module to common storage. This interface is later used by all other CMEM subsystems. Upon startup, every CMEM subsystem registers itself with the Unix for z/OS interface. This registration mechanism enables the UNIX for z/OS interface to recognize all available CMEM subsystems and to call them if an UNIX for z/OS dataset-triggering event occurs.

When a CMEM subsystem shuts down, it removes itself from the Unix for z/OS interface. The last CMEM subsystem to shut down removes the Unix for z/OS interface from common storage.

The following sequences of messages indicate that the Unix for z/OS interface was successfully installed:

- For the first CMEM subsystem to initialize

```
CME820I INITIALIZATION OF OPENEDITION SUPPORT STARTED
CME821I OPENEDITION INTERFACE MODULE SUCCESSFULLY LOADED
CME822I SUBSYSTEM REGISTERED WITH OPENEDITION INTERFACE
CME823I INITIALIZATION OF OPENEDITION SUPPORT ENDED SUCCESSFULLY
```

- For any subsequent CMEM subsystem

```
CME820I INITIALIZATION OF OPENEDITION SUPPORT STARTED
CME822I SUBSYSTEM REGISTERED WITH OPENEDITION INTERFACE
CME823I INITIALIZATION OF OPENEDITION SUPPORT ENDED SUCCESSFULLY
```

The following sequences of messages indicate that the Unix for z/OS interface was successfully deactivated:



- For any CMEM subsystem except from the last subsystem to shut down

```
CME830I DEACTIVATION OF OPENEDITION SUPPORT STARTED
CME831I SUBSYSTEM REMOVED FROM OPENEDITION INTERFACE
CME833I DEACTIVATION OF OPENEDITION SUPPORT ENDED SUCCESSFULLY
```

- For the last CMEM subsystem to shut down

```
CME830I DEACTIVATION OF OPENEDITION SUPPORT STARTED
CME831I SUBSYSTEM REMOVED FROM OPENEDITION INTERFACE
CME832I OPENEDITION INTERFACE MODULE REMOVED
CME833I DEACTIVATION OF OPENEDITION SUPPORT ENDED SUCCESSFULLY
```

- CMEM enables the operator to start and stop the Unix for z/OS interface using the Modify operator command. Usually, there is no need to intervene with the default processing performed by CMEM. The following operator commands are available:

```
F CONTROLO,STARTOE
F,CONTROLO,STOPOE[ ,FORCE]
```

- The STARTOE command instructs a CMEM subsystem to restart the Unix for z/OS interface. This includes initializing the interface (if no other subsystem has initialized it) and/or registering the current subsystem with the Unix for z/OS interface. If the STARTOE command is issued for a subsystem that is already registered with the Unix for z/OS interface, the following message is generated:

```
CME828I SUBSYSTEM ALREADY REGISTERED WITH OPENEDITION INTERFACE
```

- The STOPOE command instructs a CMEM subsystem to deactivate the Unix for z/OS interface. This includes removing the current subsystem from the Unix for z/OS interface and removing the Unix for z/OS interface from common storage if no other subsystem is using it. If the STOPOE command is issued for a subsystem that is not registered with the Unix for z/OS interface, the following message is generated:

```
MTO796W SUBSYSTEM NOT REMOVED FROM OPENEDITION INTERFACE: SUBSYSTEM NOT FOUND
```

- If the STOPOE command is issued when the Unix for z/OS interface is not installed, the following message is issued:

```
MTO795W OPENEDITION INTERFACE MODULE NOT INSTALLED
```

- The STOPOE,FORCE command instructs CMEM to remove the Unix for z/OS interface from common storage even if one or more CMEM subsystems are still registered with it.

CMEM also provides Started Procedure CTOOEDSC. This procedure can be started from the console using the START command. Procedure CTOOEDSC acts like a STOPOE,FORCE command and removes the Unix for z/OS interface regardless of any registered subsystems. The STOPOE,FORCE command and procedure CTOOEDSC must be used only in case of emergency.

## CONNECT DIRECT Support (Formerly NDM Support)

Control-M supports CONNECT DIRECT software, which creates dataset events (that is, the appearance of a dataset) on the system. CONNECT DIRECT support enables dataset events to automatically trigger Control-M operations (adding and deleting prerequisite conditions, and/or triggering jobs) to handle these events.

The Control-M user creates and modifies dataset event definitions by using online Event Definition and Event List screens.

CONNECT DIRECT support consists of the following phases:

- Implementation and Customization

Create a Rules library with the following attributes:

LRECL=132, BLKSIZE=13200, DSORG=PO, RECFM=FB

Add the @@IDCNTL member to the Control-M PARM library. This member must contain a single line (in the format shown in the table below) for each user who is going to use this facility.

**Table 113      Format of Line in the @@IDCNTL Member**

| Columns | Description                       |
|---------|-----------------------------------|
| 01–08   | User ID                           |
| 09–52   | Name of the Rules library         |
| 53–60   | Member name (user ID recommended) |

When a table or an event list table was in use during the execution of an IOADDC request, and no successfully triggered event was processed, Control-M may try again to execute the request, depending on the values set for the FORCE#RT and FORCE#WI installation parameters. For more information on the FORCE#RT and FORCE#WI installation parameters, see the customization chapter of the *INCONTROL for z/OS Installation Guide: Customizing*.

When wish WM3683 is set to APPLY=YES (see member IOADFLT in the IOA IOAENV library) then all IOADDC/IOADDR Requests will verify that the requestor's USERID (ACEEUSER from the job's USER= JOB statement or the user who submitted the job) matches the USERID specified in col 1-8 of each @@IDCNTL record before checking the associated rule library/member for the corresponding dataset.

If the wish is set to NO, then the userid is not verified and the first rule library/member in which the dataset appears is used.

The setting of WM3683 does not affect IOA basic or extended security considerations but is simply used to determine which @@IDCNTL record (rule library) is to be used.

#### Example

The following sample CONNECT DIRECT script calls the IOADDR dataset driver to set a different prerequisite condition upon successful or unsuccessful completion of a file transfer:

```

IOADDSTR PROCESS PNODE=PRIMNODE
                SNODE=SECDNODE
STEP01 COPY FROM (PNODE DSN=INDSN DISP=SHR) -
                TO (SNODE DSN=OUTDSN DISP=SHR)
STEP02 IF (STEP01 = 0) THEN
    RUN TASK (PGM=IOADDR, -
            PARM=(' OUTDSN. COPY. GOOD' )) SNODE
    ELSE
    RUN TASK (PGM=IOADDR, -
            PARM=(' OUTDSN. COPY. FAILED' )) SNODE
    EIF

```

- Dataset Event Definition (REXX Procedure IOACDDR)

Dataset event definitions are created and modified by the Control-M user using online Event Definition and Event List screens. The user must define at least one Event list. An Event list is composed of dataset names and, for each dataset name, the operations that the dataset event must trigger. Event lists are defined or modified in the Dataset Event Definition facility that is activated using the IOACDDR REXX procedure. For more information, see [“REXX Procedure IOACDDR: Dataset Event Definition”](#) (on page 292).

- Automatic Operation Triggering Upon Dataset Appearance (Module IOADDR)

Once Event lists are defined, they can be used to trigger operations that are based on dataset events. The main module involved is module IOADDR.

Whenever a dataset event occurs, the IOADDR module must be invoked, and the name of the dataset must be passed to it as a standard parameter. The IOADDR module looks for the passed dataset name in the Event lists. If it finds the dataset name in a list, it initiates the corresponding action.

The IOADDR module can be called from any calling environment (job, TSO, CONNECT DIRECT, and so on). Before the module can be called, certain files must be allocated to the module.

In most cases, the calling environment allocates the required files and calls the IOADDR module directly.

If the calling environment cannot allocate the files, it cannot directly call the IOADDR module. Instead, replace calls to IOADDR with calls to the IOADDC module. In this case, the process is as follows:

The calling environment calls the IOADDC module and passes the dataset name as an argument. The IOADDC module places the dataset name in a System Logger log block that is read by Control-M.

If the IOADDC module cannot build the System Logger environment or write a System Logger log block (for example, the address space running IOADDC is not authorized), the module issues error messages to help the user troubleshoot the problem.

Control-M calls the IOADDR module and passes the dataset name as an argument. The IOADDR module checks the Dataset or Event table and triggers the corresponding event. For information on setting up the System Logger, see [“CMEM—Control-M Communication”](#) (on page 275) and the Control-M chapter in the *INCONTROL for z/OS Installation Guide:Installing*.

If the IOADDC module is executed and the System Logger interface was not enabled by the user (parameter SYSTLOGR in the IOACPRM IOA PARM member is set to 'N'), then instead of passing the dataset name argument to Control-M using the System Logger, IOADDC directly calls IOADDR to trigger the corresponding event.

To enable a single CONNECT DIRECT-caller to communicate with multiple IOA installations simultaneously, see [CONNECT DIRECT Cross Installation Support](#) (on page 296).

```
EXEC IOADDC,PARM=('dataset-name')
```

The environment that calls the IOADDR/IOADDC module must have the DAPARM DD statement allocated to it. For further information see [Customizing the IOA Online Environment](#) (on page 43).

## REXX Procedure IOACDDR: Dataset Event Definition

Event Lists are defined or modified in the Dataset Event Definition facility screens that are activated using REXX procedure IOACDDR.

The interface to the utility consists of two screens, as described in the following table:

**Table 114 Screens in the Dataset Event Definition Facility**

| Screen           | Description                                                                                                                                                                    |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Event List       | Lists all dataset events defined by the user. This screen is displayed upon entry to the utility.                                                                              |
| Event Definition | Used to define or modify specific events. When modifying an existing event, only a section of the Event Definition screen, called the Event Modification screen, is displayed. |

When the utility is accessed for the first time (when no events are yet defined for the user), the Event List screen is not displayed. Instead, the Event Definition screen is displayed directly. After one or more events are defined, the Event List screen is displayed upon entry to the utility.

Your user ID is automatically displayed at the top of both screens because Control-M checks security authorization before implementing the request.

Only one user at a time can edit a particular Event list. Other users can access that Event list in browse mode only.

The following table describes the types of operations that can be specified for events in the Event list:

**Table 115 Event List Operations**

| Operation | Description                                       |
|-----------|---------------------------------------------------|
| JOB       | A job can be ordered (or forced).                 |
| COND      | A prerequisite condition can be added or deleted. |

## Event List Screen

The Event List screen, as shown below, lists dataset events that are already defined.

```

EVENT LIST - M21. NDM TAB(M21) ----- ROW 1 TO 2 OF 2
COMMAND ==>                               SCROLL ==> CSR

S - Select, I - Insert, D - Delete
- List Of Dsnames ----- TYPE -----
- M21. LIB*                      COND
- M21. LIB*                      JOB
***** BOTTOM OF DATA *****

```

For each defined event, the screen displays the name of the dataset and the type of operation that the event must trigger.

Only one operation can be specified for each occurrence of a dataset name in the list. However, the same dataset name can be specified many times, thereby allowing multiple operations to be specified for the same dataset event.

The following table describes the options in the Event Modification screen. Specify one of these options to the left of a dataset name, and press Enter.

**Table 116 Options in the Event Modification Screen**

| Option     | Description                                                                                              |
|------------|----------------------------------------------------------------------------------------------------------|
| S (Select) | Display the selected event in the Event Modification screen. The event can then be modified, if desired. |
| I (Insert) | Add a new event below the selected event. The Event Definition screen is displayed with no entry.        |
| D (Delete) | Delete the selected entry. A confirmation window is displayed (default: No).                             |

## Event Definition Screen

The following code shows the Event Definition screen:

```

----- K15 EVENT DEFINITION SCREEN -----
COMMAND ===>                                SCROLL ===> CSR

DSNAME          ===>

----- ' JOB'  TYPE PARAMETERS -----
SCHED.  LIB.    ===>

TABLE NAME      ===>

JOB NAME        ===>

ODATE           ===>      (Date/Odat)   OR   ===>      (MM DD)

FORCED SCHED.   ===>      (Yes/No)

----- ' COND' TYPE PARAMETERS -----
FUNCTION         ===>      (Add/Delete)

CONDITION NAME   ===>

CONDITION DATE   ===>      (Date/Wdate/STAT) OR   ===>      (MM DD)

```

The screen is divided into three sections of parameters, as described in the following table:

**Table 117 Event Definition Screen Sections**

| Section                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dataset Name           | <p>This section contains one parameter for the name of the dataset event.</p> <ul style="list-style-type: none"> <li>▪ DSNAME - Name of the dataset event (the dataset whose appearance triggers the operation).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 'JOB' TYPE PARAMETERS  | <p>This section lists parameters that are relevant only if the event must trigger the scheduling of a job.</p> <ul style="list-style-type: none"> <li>▪ SCHED. LIB. - Library containing the job scheduling definition of the job to be scheduled.</li> <li>▪ TABLE NAME - Table containing the job scheduling definition of the job to be scheduled.</li> <li>▪ JOB NAME - Name of the job to be scheduled. If blank, the entire table is ordered.</li> <li>▪ ODATE - Date to schedule the job. Valid values are ODAT or a four-character date in mmdd or ddmm format (depending on the site standard).</li> <li>▪ FORCED SCHED. - Indicates whether to force the job if it will not otherwise be scheduled. Valid values are: <ul style="list-style-type: none"> <li>o Yes – Force the job.</li> <li>o No – Do not force the job. Default.</li> </ul> </li> </ul>                              |
| 'COND' TYPE PARAMETERS | <p>This section lists a parameter that is relevant only if the event must trigger the addition or deletion of a prerequisite condition.</p> <ul style="list-style-type: none"> <li>▪ FUNCTION - Function to perform. Valid values are: <ul style="list-style-type: none"> <li>o Add – Add the specified condition</li> <li>o Delete – Delete the specified condition.</li> </ul> </li> <li>▪ CONDITION NAME - Prerequisite condition to be added or deleted.<br/>Note: Long condition names cannot be used in Connect Direct event definitions.</li> <li>▪ CONDITION DATE - Date associated with the prerequisite condition. Valid values are: <ul style="list-style-type: none"> <li>o DATE (system date)</li> <li>o WDATE (Control-M working date)</li> <li>o STAT (not date-dependent - a four-character date in mmdd or ddmm format (depending on the site standard))</li> </ul> </li> </ul> |

To define an event and corresponding operation, fill in the DSNAME and either the JOB or the COND type parameters (only one type can be used in each definition), and press Enter.

Note: If you selected an existing event in the Event List screen, only the screen section relating to that event (JOB or COND) is displayed and the screen is called the Event Modification screen. Modify the event as desired and press Enter.

## CONNECT DIRECT Cross Installation Support

CONNECT DIRECT Cross Installation supports a single CONNECT DIRECT address space which communicates with multiple IOA installations, including different releases of IOA, simultaneously. This support also provides for a complete and seamless upgrade path from one IOA release to another vis-a-vis the CONNECT DIRECT-IOADDC interface (see explanation below of the IOADDC routine).

### Components

The support is based on two components:

- IOADDI - A short-running job (the procedure found in the IOA PROCLIB library) you execute prior to any CONNECT DIRECT-IOADDC interface request. This job 'registers' the IOA installation by saving installation information in a persistent system-wide control block. Among other fields, this control block contains relevant fields from the IOACPRM and CMMPLEX IOA PARM members referenced by the DAPARM DD statement.

This job must be run:

- with different JCL statements (in the DAPARM DD statement) for every IOA installation on every system that runs CONNECT DIRECT and IOADDC.
- only once.
- prior to the first CONNECT DIRECT-IOADDC request.

whenever there is any change to the IOACPRM and CMMPLEX IOA PARM members.

- IOADDC - A routine linking a CONNECT DIRECT address space to an IOA installation. The routine receives an input trigger and the IOA installation QNAME. The QNAME is set by the user and taken from the QNAME parameter in the IOAPARM IOA PARM member. Depending on the settings in the IOACPRM and CMMPLEX IOA PARM members referenced by the DAPARM DD statement of the relevant run of the IOADDI job, IOADDC determines whether the input trigger is passed to the IOA installation (the IOADDR module) directly or via the MVS system logger interface.

This routine accesses the control block built by IOADDI. If the user-specified QNAME is not found in the system-wide control block or the control block is not found, the request is aborted with a clear error message. If no QNAME is present in the request, module IOADDC will function as it did previously, that is, IOADDC sends the input trigger to the IOA installation (IOADDR module) based on the relevant fields from the IOACPRM and CMMPLEX IOA PARM members referenced by the DAPARM DD statement allocated to the IOADDC caller.



## Tracing

To trace the IOADDI and IOADDC process, set the trace level to 72 by adding the following to the IOADDI job and to the CONNECT DIRECT address space that calls IOADDC:

```
//DATRCIN DD *  
  
TRACE=72  
  
/*
```

All trace messages will appear in the system log, so BMC recommends that you perform the trace infrequently or when you encounter problems.

## Workload management service class support

Control-M can automatically assign jobs to workload management (WLM) service classes. The WLM SRVCLASS table, WLMSCSTBL, located in the CTM PARM library, can be created by the user and will be used by Control-M as the driver of workload management service class support. If present, the table is automatically loaded at Control-M initialization. When a job is submitted by Control-M, the job is assigned the 'Job-Init' service class. If the job is submitted after DUE-IN time, the job is assigned the 'AftDueIn' service class. If the job is submitted or is running after DUE-OUT time, the job is reset to the 'AfDueOut' service class. Workload management service class support is composed of the following:

- The WLMSCSAM sample table, which resides in the CTM PARM library. It contains usage notes, a complete description of the processing involved, and the table layout. This sample table can be used as a template when the actual WLM SRVCLASS table, WLMSCSTBL, is created.
- The NEWLMSCSTBL operator command, which enables the user to have Control-M dynamically reload the table while Control-M is running.
- The CTMX020 user exit, in which the user can make a last-moment change to the service class Control-M is about to assign to the job.

## WLMSCSTBL table

The user can create the WLMSCSTBL table, which is the WLM SRVCLASS table in the CTM PARM library. A sample table, WLMSCSAM, is provided in the CTM PARM library, for this purpose.

The WLMSCSTBL table is the main driver of workload management service class support. If present, it is loaded at Control-M initialization time and may be reloaded by a user request, by issuing the following operator command:

```
F CONTROLM,NEWLMSCSTBL
```

After a successful load or reload, a positive informational message is displayed. If the table does not exist, no error or warning message is displayed. If the table exists but a syntax error is detected, clear error messages will be displayed describing the error.

## WLMSCCTL table security authorization

In order for you to control or monitor access to the WLMSCCTL table separately from other Control-M libraries, a separate DAPARMM key was created in the IOADSN member of the IOA IOAENV library. This allows the user's security authorization facility to focus on this particular table alone.

### Table layout

The WLMSCCTL table contains several fields, some of them optional, laid out in fixed columns. The following table outlines the uses for each column:

**Table 118 WLMSCCTL table**

| Column Number | Definition             | Comment             |
|---------------|------------------------|---------------------|
| 1             | comment indicator (*)  |                     |
| 2             | job name mask          | up to 8 characters  |
| 11            | application name mask  | up to 20 characters |
| 32            | from time              | in HHMM format      |
| 37            | to time                | in HHMM format      |
| 42            | Job-Init service class | up to 8 characters  |
| 51            | AftDueIn service class | up to 8 characters  |
| 60            | AfDueOut service class | up to 8 characters  |

The following code shows an example of some of the entries in the WLMSCSAM sample table:

|                |                         |             |             |                  |                  |                  |
|----------------|-------------------------|-------------|-------------|------------------|------------------|------------------|
| <b>*0</b>      | <b>1</b>                | <b>3</b>    | <b>3</b>    | <b>4</b>         | <b>5</b>         | <b>6</b>         |
| <b>*2</b>      | <b>1</b>                | <b>2</b>    | <b>7</b>    | <b>2</b>         | <b>1</b>         | <b>0</b>         |
| <b>*!</b>      | <b>!</b>                | <b>!</b>    | <b>!</b>    | <b>!</b>         | <b>!</b>         | <b>!</b>         |
| <b>*!</b>      | <b>!</b>                | <b>!</b>    | <b>!</b>    | <b>!</b>         | <b>!</b>         | <b>!</b>         |
| <b>*V</b>      | <b>V</b>                | <b>V</b>    | <b>V</b>    | <b>V</b>         | <b>V</b>         | <b>V</b>         |
| <b>K15JOBA</b> | <b>TESTAPPLI CATION</b> | <b>2200</b> | <b>0200</b> | <b>STANDARD</b>  | <b>QUI CK</b>    | <b>QUI CKER</b>  |
| <b>N50*</b>    |                         | <b>0000</b> | <b>2359</b> | <b>QUI CK</b>    | <b>QUI CKER</b>  | <b>QUI CKEST</b> |
|                | <b>EMERGENCYAPPL</b>    | <b>0000</b> | <b>2359</b> | <b>QUI CKEST</b> | <b>QUI CKEST</b> | <b>QUI CKEST</b> |
| <b>STAMJOB</b> |                         | <b>1700</b> | <b>2000</b> | <b>STANDARD</b>  |                  |                  |
| <b>STAMJOB</b> |                         | <b>2200</b> | <b>0200</b> | <b>QUI CK</b>    |                  |                  |
| <b>*</b>       | <b>PROD*</b>            | <b>0000</b> | <b>2359</b> | <b>STANDARD</b>  | <b>QUI CKER</b>  | <b>QUI CKEST</b> |

## Processing and usage notes

When a job starts on time, if the job or application name (or both) appears in the table and the current time is within the time-from and time-to range, the 'Job-Init' service class is assigned to the job (if column 42 is not set to blank).

When a job starts after its DUE-IN time, if the job or application name (or both) appears in the table and the current time is within the time-from and time-to range, the 'AftDueIn' service class is assigned to the job (if column 51 is not set to blank).

When a job is executing after its DUE-OUT time, if the job or application name (or both) appears in the table and the current time is within the time-from and time-to range, the job is reset to the 'AfDueOut' service class (if column 60 is not set to blank).

If the job name mask (but not the application name mask) is present, a match will be attempted on the job name mask only. If the application name mask (but not the application name mask) is present, a match will be attempted on the application name mask only. If both job name and application name masks are present, a match will be attempted on both.

In addition to searching for a job name or application name match, the current time must be within the time-from to time-to range in order to be considered a 'matched entry'. In other words, there may be several entries for the same job name or application name (or both) with different time-from to time-to ranges.

The first job name or application name mask match in the current time range, that is, within the current time in the time-from to time-to range, stops the search. At this first matching occurrence, Control-M does not continue looking through the table for additional matches. Based on this rule, more specific entries should be placed on the top of the table and less specific, general entries should be placed on the bottom of the table.

This processing is only done for non-NJE jobs. For NJE jobs, since the WLM environment may be completely different on the remote system, service class setting is not performed.

The ROUTE and E (RESET) operator command will be used if Control-M cannot tell whether the job is running on the current system or on another system in the same SPOOL. (The ROUTE command deals with all systems in the SYSPLEX.) An informational message will be sent to IOA LOG, to indicate the service class setting.

If Control-M can determine that the job is running on the current system, Control-M issues the IWMRESET WLM macro. If successful, a message is sent to IOA LOG to indicate the service class setting. If WLM returns with an error response, Control-M sends an error message to IOA LOG describing the service class and the error return and reason code.

Job (not STC) names are unique within this SPOOL, so using the ASID parameter on the E operator command is not necessary.

## CTMX020 exit processing

After Control-M determines which service class to assign to the job, but immediately before the service class is about to be set or reset (even if Control-M will not set any service class), Control-M calls user exit 20. The user exit is passed the following information:

- 8-character function code (JOBINIT, AFTDUEIN, or AFDUEOUT)
- pointer to job name
- pointer to MCT
- pointer to MIT
- pointer to start of the internal WLMSC\_TBL table (if the table exists)
- service class to be set or blanks
- pointer to the matched internal WLMSC\_TBL table entry (if the table exists and if a table entry actually matched the current job)

The user exit may change the service class. After returning to Control-M, the service class is checked. If it is non-blank or blank, Control-M will either issue or not issue the appropriate E operator command or WLM macro, to set or reset the service class.

## Control-M VM Support

Most medium to large computer centers maintain a complex production environment based on multiple operating systems and platforms. A typical, large computer center can employ MVS/ESA, VM, VAX/VMS, AS/400, Unix machines, PCs, and so on.

This section details how Control-M and IOA can easily be implemented in order to automate control of VM operations through standard MVS and VM operating system functions and specific Control-M features.

One of the most popular combinations at these computer centers is the coupling of MVS and VM. These computer centers require integrated production control capabilities for both operating systems. One aspect of integrated production control is the capability to automate processes in the VM environment. For example, VM commands or EXECs must automatically be executed under VM at certain times, or according to events that occur in either MVS or VM. Usually, these VM commands or EXECs must be executed in certain sequences, and the results must be checked to ensure that the commands or sequences have completed successfully. Another aspect of integrated production control is the synchronization of processes in and between MVS and VM. For example, an MVS-based application may require an input file to be received from VM before the application can proceed.

There is no single answer or solution to every problem. Much depends on the hardware and software configurations implemented at your site. Some of the solutions described in this section may not be appropriate for your site. Therefore, for some problems, more than one solution or approach has been presented. Each site can determine which solution is most suitable for its environment.

## VM Configurations

To automate processes in the VM environment and synchronize MVS and VM processes, the VM configuration must facilitate appropriate communication with MVS. Three popular configurations exist for running MVS and VM operating systems at the data center:

- MVS running under VM
- MVS and VM running on separate computers
- MVS and VM running under LPAR

The configuration implemented at your site determines which techniques are applicable. The following topics describes these configurations.

## MVS Running Under VM

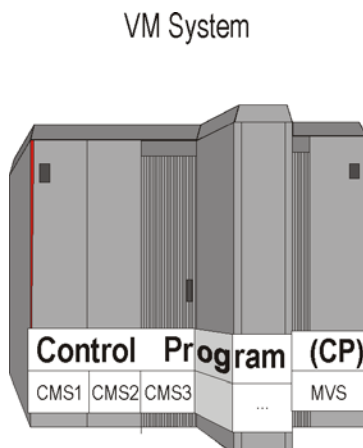
The VM system runs the Control Program (CP) together with a number of Conversational Monitor System (CMS) virtual machines. In addition, an MVS virtual machine is activated that operates Control-M.

When MVS is running under VM, the following options are available for transferring data between the MVS and VM operating systems:

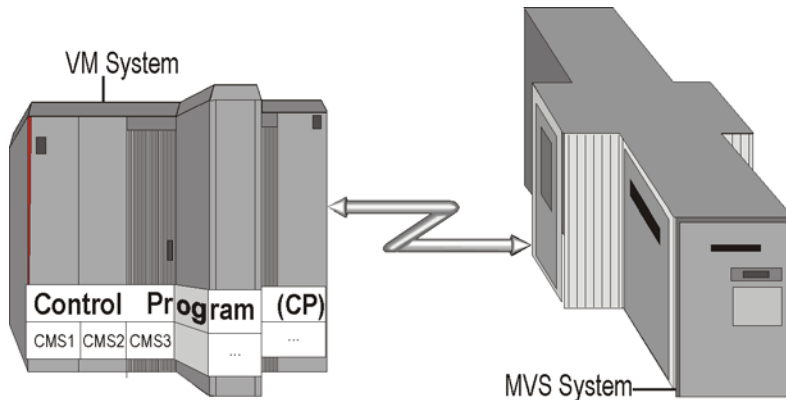
- A VM CP command can be issued in the MVS machine, using the DIAGNOSE machine command. This allows the MVS machine to issue commands to be processed by VM.
- If an RSCS machine is operated under VM, then RJE or NJE connections can be established between VM and MVS. This allows jobs and sysouts to be transferred between MVS and VM.
- If a VM/VTAM machine is operated under VM, SNA connections can be established between MVS and VM. This allows a VM terminal user to invoke the IOA Online interface.
- If a disk or minidisk is shared between MVS and VM, a PS or PO file created under MVS can be read from VM CMS.
- If a card reader or punch is defined in MVS, files can be passed between MVS and VM.

The following figure shows MVS Running Under VM:

**Figure 28 MVS Running Under VM**



## MVS and VM Running on Separate Computers



The above VM and MVS systems run on separate computers. However, on some levels, communication exists between the two computers.

The options available for transferring data between the MVS and VM operating systems running on separate computers include the following:

- If an RSCS machine is operated under VM, then RJE or NJE connections can be established between VM and MVS. This allows jobs and sysouts to be transferred between MVS and VM.
- If a VM/VTAM machine is operated under VM, SNA connections can be established between MVS and VM. This allows a VM terminal user to invoke the IOA Online interface.
- If a disk is shared between MVS and VM, a PS or PO file created under MVS can be read under VM.

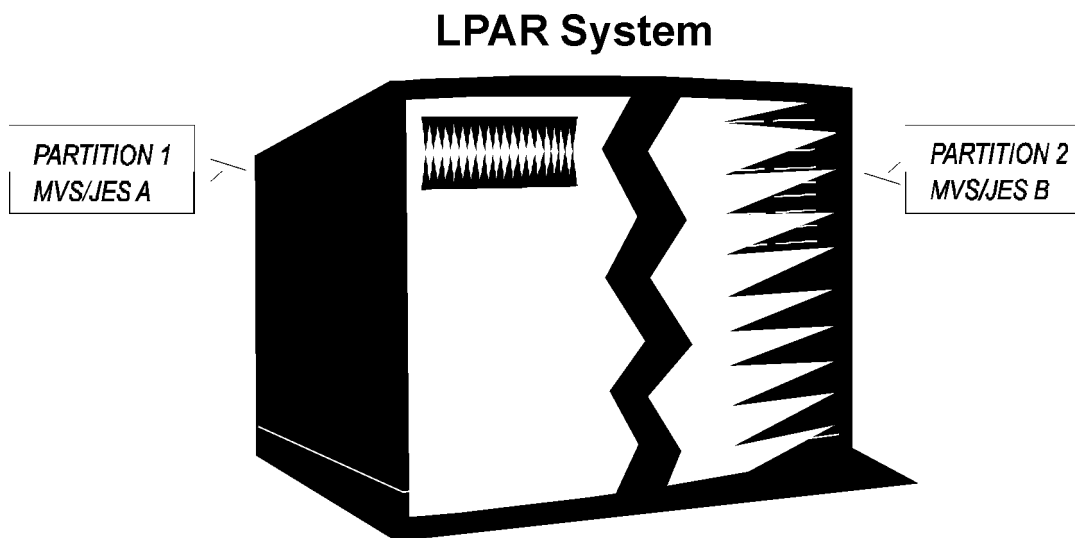
## MVS and VM Running Under LPAR

The LPAR (Local Partitioning) feature in an IBM mainframe allows the installation to (optionally) divide the mainframe into partitions and run multiple operating systems in parallel.

For our purposes, each partition can be regarded as a standalone mainframe computer. Therefore, when partitioning is used, we can regard the processor complex as a type of multi-CPU configuration.

The following figure shows MVS and VM Running Under LPAR:

**Figure 29 MVS and VM Running Under LPAR**



If, as in the diagram above, one partition runs MVS and the other partition runs VM, the previous discussion of VM and MVS running on separate machines is also applicable.

The above discussion of the PR/SM feature also applies to users of MDF (Multi-Domain Facility) from AMDAHL, MLPF (Multiple Logical Processor Facility) from HDS (Hitachi Data Systems), and any other supported CPU with hardware partitioning capabilities.

## Invoking the IOA Online Facility From a VM Terminal

If appropriate interactive communication connections are set up between the VM and MVS operating systems, a VM terminal user can log onto an MVS VTAM application that supports the IOA Online facility (for example, TSO, CICS, IMS/DC, IOA VTAM Monitor, IDMS/DC, ROSCOE and COM-LETE).

All examples in this document assume the use of an IOA VTAM monitor. However, each site must determine which of the previously mentioned MVS VTAM applications is most suitable.

Once the VM user has entered the IOA Online facility, all tracking and control options of Control-M and IOA are available to the user. For example, the user can add or delete prerequisite conditions, define a new job schedule, order a job, view job run results, hold a job, and so on.

Several methods exist for setting up interactive communication connections, depending on the software and hardware configurations used at each site:

- dialing into the z/OS computer (MVS under VM only)
- using VM/VTAM
- using the IOA Logical Terminal Emulator
- using a session handling product

## Dialing Into the MVS Machine (MVS Under VM Only)

A VM terminal user can dial directly into the MVS machine (at a predefined address), receive the MVS VTAM logon screen, and then log onto the IOA VTAM monitor running under MVS.

## Using VM/VTAM

If VM/VTAM is employed under VM, a VM terminal user can dial into the VM/VTAM machine, and then establish (from the VM/VTAM screen) a cross-domain session with the IOA VTAM monitor running under MVS.

## Using IOA's Logical Terminal Emulator

The IOA Logical Terminal Emulator can be employed in conjunction with VM/VTAM. This facility allows the user to establish a VTAM session without leaving CMS. A session can be established in this way with the IOA VTAM monitor running under MVS. At the end of the session, the user remains at the VM/CMS machine.

In addition, the user's sign-on procedure "can be taught" this option and, on future invocations, can automatically repeat the option. For additional information on this subject, see the IOA chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

## Using a Session Handling Product

There are several session handling products available for the VM environment, such as VM/Pass-through (PVM), Tubes and Vterm.

If such a product is employed under VM, a VM terminal user can use that product to log on the MVS system, and then log on to the IOA VTAM monitor running under MVS.

## File Transfer From MVS to VM

### General

This chapter demonstrates several techniques for sending a SYSOUT or file to VM. Some of these techniques utilize Control-M functions. Others utilize standard functions of MVS/JES, VM, and/or other products.

All of the following JCL examples assume that

- an NJE connection exists between the MVS and VM machines
- the VM node ID is VMPROD
- the sysout or report is to be routed to a VM machine (user) named USER1
- the sysout class is A

Sysouts or files that are sent to the VM user using NJE/RSCS are placed in the VM user's Reader queue. The VM user periodically checks the user's Reader queue using the RL (RDRLIST) command. If a file from MVS is found, the user can, for example, browse the file (using the PEEK command) or move it to the A minidisk (using the RECEIVE command).



## Routing the Production Job's Report to VM using JCL

A specific report created by a Control-M production job can be routed using NJE services to a VM machine (user), simply by defining the destination of the report in the job's JCL. The following examples demonstrate how to implement this using standard MVS and JES statements:

- Route the report to a certain VM user using parameter `DEST=(VMPROD,USER1)` in the appropriate DD statement:

```
//REPORT DD SYSOUT=A,DEST=(VMPROD,USER1)
```

- Route the report to a specified VM user using an MVS OUTPUT statement and the report's DD statement referencing that MVS OUTPUT statement

```
//JOB1 JOB ...
//OUTREP OUTPUT DEST=VMPROD.USER1
//STEP1 EXEC PGM=...
//REPORT DD SYSOUT=A,OUTPUT=*.OUTREP
```

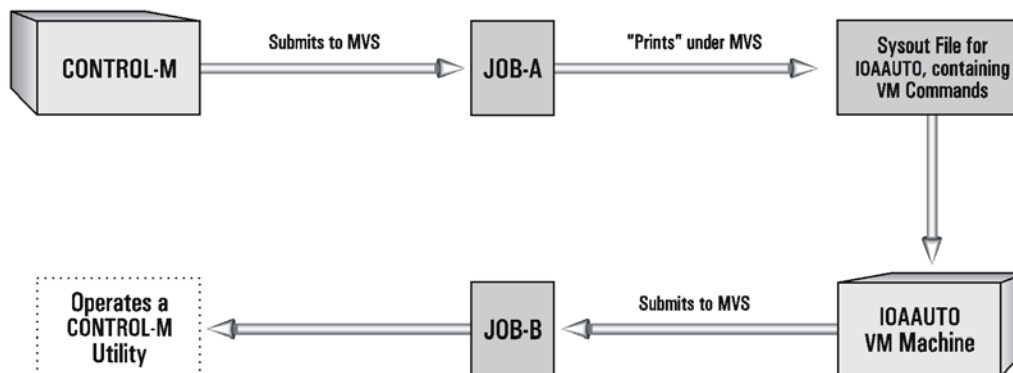
- Route printed sysout files of the job to a specified VM user using a JES2 `/*ROUTE PRINT` statement:

Punched sysout files of the job can be sent to VM using the JES2 `/*ROUTE PUNCH` statement. A punched SYSOUT file consists of 80-character records. Most sites define JES output CLASS B as a punch class.

```
//JOB1 JOB ...
/*ROUTE PRINT VMPROD.USER1
//STEP1 EXEC PGM=...
//REPORT DD SYSOUT=A
```

The following figure shows Routing the Production Job's Report to VM using JCL:

**Figure 30 Routing the Production Job's Report to VM using JCL**



## Routing Production Job SYSOUT to VM using JCL

When a Control-M production job has finished executing, the Control-M monitor requires that the job's first three SYSOUT files (SYSDATA) reside in the MVS spool in held mode, in order to analyze how the job has completed. Once the SYSDATA has been analyzed, it can be purged, released for printing, and so on.

Sometimes, the SYSDATA of a Control-M production job may require routing to a VM user. This can be accomplished by specifying two MVS output statements in the job's JCL.

These two output statements cause the creation of two copies of the SYSDATA. One copy is assigned standard attributes and can be analyzed by Control-M. The other copy is directed to the VM machine named USER1.

```
//j obname JOB ...
//COPY1 OUTPUT JESDS=ALL, CLASS=*

//COPY2 OUTPUT JESDS=ALL, CLASS=A, DEST=VMPROD. USER1

.....
```

## Routing Production Job SYSOUT to VM using Control-M SYSOUT Functions

Control-M SYSOUT functions can route the production job's SYSOUT (or parts of it) to a VM node. Only the VM node name can be specified (no user ID can be assigned within the destination name). However a JES2 destination ID (defined in JES2 as nodeid.userid) can be specified. As a result, the output is routed to a specific VM user operating in the VM node.

Control-M can then be used to route selected outputs of a production job (for example, the whole SYSOUT, one or more reports, messages, files) to a specific VM machine (user).

## Sending a File to VM in the Form of a Sysout

Control-M can be used to trigger file transfer to a VM machine. Perhaps the easiest way to perform the file transfer is for Control-M to schedule a job to run under MVS and produce a SYSOUT file with the appropriate destination.

In the following example, the data to be sent are 80-byte records. In order to print larger data records, use DD statement SYSUT1 to reference a sequential input file that contains these larger data records.

## Example

The following figure shows sending a file to VM as a Sysout:

**Figure 31 Sending a File to VM as a Sysout**

```
//j obname JOB ...
//PRINT EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=*
//SYSIN DD DUMMY
//SYSUT2 DD SYSOUT=A, DEST=(VMPROD, USER1)
//SYSUT1 DD *
data to be sent
data to be sent
data to be sent
/*
//
```

## File Transfer Product Information

For information about this topic, see [File Transfer Products](#) (on page 335).

## Utilize a Shared Disk Between MVS and VM

If a disk or minidisk is shared between MVS and VM, a PS or PO file created under MVS can be read from VM CMS.

Sometimes there is no need to transfer the PO/PS file to VM. Perhaps just a notification is needed to inform the user that the file created under MVS is now available. For a description of various user notification options, see [IOA—An Integrated Solution](#) (on page 311).

For a description of the various VM CMS commands that process and query MVS datasets such as MOVEFILE or STATE, see the relevant IBM manual.

MVS catalog services cannot be accessed in a standard way from VM. Therefore, to read the file, the VM CMS user must know on which disk the file resides.

## Triggering an Event in Control-M by a VM User

The following topics describe two techniques for triggering an event in Control-M. Triggered events can cause Control-M to run jobs in the z/OS environment, stop jobs from being submitted, order VM-generated jobs into Control-M, and so on.

### Submitting a Job to MVS to Execute a Control-M Utility

A VM user can communicate with Control-M by submitting a job that invokes an appropriate utility.

For example

- A VM user can submit a job to MVS that invokes utility IOACND or another IOA/Control-M utility.
- A job can activate utility IOACND in one of its job steps to add or delete a certain prerequisite condition. Prerequisite conditions can trigger various events in Control-M and IOA (such as, causing jobs to be submitted or stopping jobs from being submitted).
- A job can invoke a KSL utility. KSL utilities can perform any function that is available under the IOA Online facility.

Prerequisite conditions can also be added and deleted by CMEM, as explained in "Submitting a Job to MVS to be Monitored by CMEM."

By default, all VM-generated jobs receive the same security attributes in MVS, regardless of who generated them. Contact your security administrator about how this problem is handled at your site.

### Submitting a Job to MVS to be Monitored by CMEM

The Control-M Event Manager Facility (CMEM), operating under MVS, can acknowledge a job originating from VM (by its job name) and perform various actions upon arrival or completion of the job or upon specific job execution events.

## Sample Functions Available using CMEM

- Give Control-M full control over job processing.

When a job is submitted by a VM user to MVS, CMEM places a job order for that job in the Control-M Active Jobs File. Control-M treats the job as a regular job.

Note: If the job is submitted with parameter TYPRUN=HOLD in the JOB statement, Control-M releases the job for execution when all scheduling requirements are fulfilled.

When the job finishes execution, execution analysis is performed as usual. If the job order contains post-processing instructions, they are carried out in the same manner as for a regular job.

- Add or delete a prerequisite condition in case of job arrival or completion.

CMEM can be ordered to add or delete a prerequisite condition when the VM-generated job is displayed on the MVS internal reader, or when the VM-generated job finishes execution in the MVS environment.

For example, CMEM can be ordered to add prerequisite condition SEND-NOW-FILE1 when the MVS system displays a job named VMJOB1. The SEND-NOW-FILE1 prerequisite condition can cause Control-M to submit a job that causes an MVS file named FILE1 to be sent to VM.

The addition or deletion of prerequisite conditions in this manner does not interfere in any way with the execution of the VM-generated job, nor does Control-M analyze execution results for the job.

- Monitor dataset usage of the job.

CMEM can be ordered to monitor the execution of a VM-generated job with regard to dataset creation, deletion or access.

For example, CMEM can be ordered to add prerequisite condition FILE1-CREATED when a VM-generated job creates a file named FILE1 in the MVS system. Prerequisite condition FILE1-CREATED can trigger a job that sends a user notification back to VM (the following topics describe the various techniques).

For more information, see the CMEM chapter in the *Control-M for z/OS User Guide*.

## Control-M Triggering of Events in VM

This topic demonstrates how to trigger an event in the VM environment. For example, events can be triggered that cause user notification, attach or detach devices, operate a virtual machine in disconnected mode, initiate a backup process, and so on.

Depending on the software and hardware configuration used at your site, there are at least two methods of triggering an event

- issuing a VM CP Command using IOAOPR (MVS under VM only)
- executing VM Commands using the IOAVAUTO machine

### Issuing a VM CP Command Using IOAOPR (MVS Under VM Only)

If the MVS system is running under VM, you can use utility IOAOPR to issue a VM CP command to VM. Any command that begins with the letters CP followed by a blank is considered by IOAOPR to be a VM CP command.

The MVS machine must be defined with appropriate security privileges and authorizations to enable IOAOPR to issue the commands.

Utility IOAOPR returns a completion code to indicate whether the VM CP command has succeeded. Control-M can check the completion code and act accordingly. (For example, Control-M can add or delete a prerequisite condition, reschedule the IOAOPR job after several minutes, and so on.)

If utility IOAOPR is operated under an MVS that is not running under VM, IOAOPR issues an error message if ordered to process a VM CP command.

For additional information about utility IOAOPR, see the *INCONTROL for z/OS Utilities Guide*.

In the following examples, utility IOAOPR is run as a job, and the VM command to be executed is defined in the PARM field:

#### Example 1

```
//j obname JOB ...
//COMMAND EXEC IOAOPR, PARM=' CP MSG USER1          JOBA ENDED OK'
```

This job notifies the VM user, USER1, that JOBA has ended successfully.

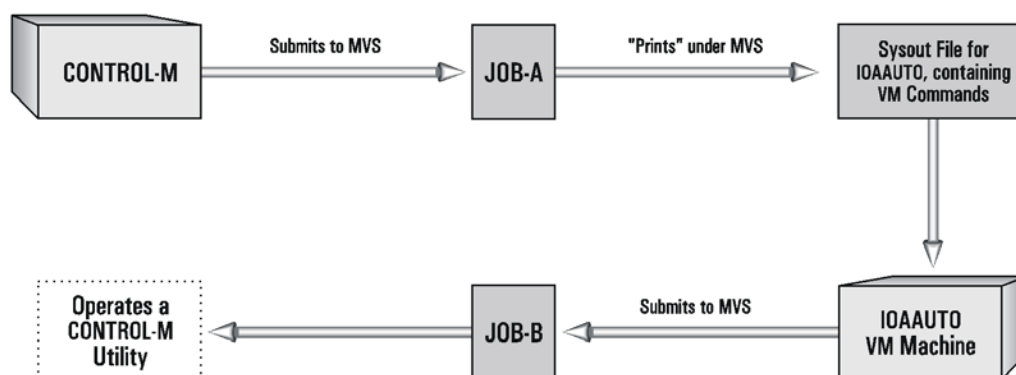
#### Example 2

```
//j obname JOB ...
//COMMAND EXEC IOAOPR, PARM=' CP AUTOLOG BATCH01'
```

This job operates a VM machine named BATCH01 in disconnected mode.

VM/ESA sites can use the XAUTOLOG command instead of the AUTOLOG command.

### Executing VM Commands using the IOAVAUTO Machine



A special VM AUTOLOG machine (called IOAVAUTO below) can be set up to execute commands under VM, and (optionally) inform Control-M as to whether the commands have been performed successfully.

The IOAVAUTO machine must be defined with appropriate security privileges and authorizations to enable IOAVAUTO to execute the VM commands.

One way in which Control-M can send a command file to IOVAUTO is by submitting a job that produces a SYSOUT file to be passed to the VM IOVAUTO machine. The SYSOUT file can contain one or more REXX commands. The SYSOUT file is passed by JES to VM (RSCS) and is placed on IOVAUTO's reader.

The IOVAUTO machine (driven by EXEC IOAVEEXEC) awaits the arrival of command files sent to the machine's reader. When a reader file arrives, it is received and processed. In addition, the commands processed are logged on minidisk A in file IOA LOG.

Optionally, an indication can be sent to Control-M as to whether the commands have succeeded, enabling Control-M to take appropriate action. (For example, Control-M can trigger another job, reschedule the same commands to IOVAUTO after several minutes, and handle similar processes).

EXEC IOAVCND is supplied to inform Control-M as to whether the request has been performed successfully. IOAVCND generates a job and submits it to MVS. The job operates utility IOACND to add or delete a prerequisite condition in Control-M. The example below illustrates how to call utility IOAVCND.

### Example

An important message has to be delivered to VM user USER1.

JOB1 is defined in Control-M as a cyclic job, with an interval of 20 minutes. JOB1 is triggered by prerequisite condition SHOUT-REQUIRED. The JCL for JOB1 is as follows:

```
//JOB1      JOB    ....
//REQUEST   EXEC   PGM=IEBGENER
//SYSPRINT  DD     SYSOUT=*
//SYSIN     DD     DUMMY
//SYSUT2    DD     SYSOUT=A, DEST=(VMPROD, IOVAUTO)
//SYSUT1    DD     DATA, DLM=@@
/* REXX EXEC */
'MSG USER1 Production Job PRDUPDT has abended!'
IF RC = 0 THEN 'EXEC IOAVCND DELETE SHOUT-REQUIRED 0101'
EXIT(0)
@@
//
```

JOB1 is submitted by Control-M upon the creation of prerequisite condition SHOUT-REQUIRED (by another job or process). JOB1 runs under MVS and produces a SYSOUT file containing four REXX statements to be passed to the VM IOVAUTO machine.

The IOVAUTO machine reads the file from its reader and processes the command file.

If the MSG command is performed successfully by the IOVAUTO machine, a job is sent to MVS that deletes prerequisite condition SHOUT-REQUIRED.

If the MSG command is unsuccessful, no feedback is sent back to MVS. As a result, JOB1 is run again by Control-M (about 20 minutes after its previous run), and another attempt is made to deliver SHOUT message to the VM user.

## Issuing a SHOUT Message to a VM User

### General

SHOUT is the IOA notification facility by which operations personnel and departmental users are notified of significant events in the production environment. The SHOUT mechanism enables Control-M to send notifications to VM users instead of, or in addition to, other MVS destinations.

The VM operating system does not employ a function equivalent to the MVS BROADCAST function, which maintains user notification messages. If a SHOUT is issued to a VM user who is not logged on at that time or to a VM user who has suppressed the receipt of messages, the SHOUT is not effective.

The following is a brief list of IOA techniques can be used to send notification messages to a VM user. All of these techniques allow you to verify that the notification message has reached its destination.

- using utility IOAOPR
- using the VM IOAVAUTO machine
- other IOA options

### Using Utility IOAOPR

If MVS is running under VM, Control-M can schedule an IOAOPR job or started task to issue a SHOUT message to a VM user.

For more information about utility IOAOPR and a detailed example of how to issue the notification, see [Issuing a VM CP Command Using IOAOPR \(MVS Under VM Only\)](#) (on page 308).

### Using the VM IOAVAUTO Machine

Control-M can schedule a request to the VM IOAVAUTO machine to issue a SHOUT message to a VM user, and (optionally) inform Control-M whether the SHOUT has been performed successfully.

For more information about the VM IOAVAUTO machine, and a detailed example of how to set up the notification request, see [Executing VM Commands using the IOAVAUTO Machine](#) (on page 309).

### Other IOA Options

Additional options exist if Control-O or Control-M/Links for Windows NT operate at the site (detailed in the topics "Control-O" and "Control-M/Links for Windows NT").

## IOA—An Integrated Solution

The following topics describe some unique facilities in various INCONTROL products that may be of interest to the VM operations staff.

### Control-O

Control-O is the IOA Console Automation Product. The main Control-O functions relevant to VM are

- issuing a VM CP command
- If MVS is running under VM, Control-O can issue VM CP commands using parameter DO COMMAND.

- accessing VM machines using KOA

The KeyStroke OpenAccess Facility (KOA) permits two-way communication between Control-O and any VTAM application. If VM/VTAM is operated under VM, Control-O can log onto a VM machine.

## Control-M/Links for Windows NT

Control-M/Links for Windows NT is the IOA Outboard Automation Product, designed to manage multiple heterogeneous systems. The main Control-M/Links for Windows NT functions relevant to VM are

- VM system and hardware console support

Control-M/Links for Windows NT can initiate and perform the IML/IPL process on local or remote VM systems, issue operator commands and automatic responses, and so on.

- logon to VM applications

The Control-M/Links for Windows NT 3270 emulation session support enables it to log on to one or more virtual machines running applications.

- enterprise-wide automation

Control-M/Links for Windows NT can fully control the MVS and VM systems from a single, centralized point.

Among other things, Control-M/Links for Windows NT can be used to

- consolidate console messages from both z/OS and VM consoles in one window
- coordinate actions across z/OS and VM platforms.

For example, when a certain message is displayed on the z/OS console, Control-M/Links for Windows NT can notify a VM user.

## Control-D

Control-D is the IOA output management or distribution product, providing scheduling and control for every aspect of report processing and distribution.

Report destinations of up to 16 characters can be assigned in all relevant Control-D print options. Therefore, Control-D can route selected outputs (bundles) to specific VM machines (users).

## Tuning Recommendations

The following recommendations are made with tuning as the primary consideration during the installation of Control-M. However, some of these recommendations may not be suitable for your site. If necessary, you can make changes at a later stage.



## General Tuning Issues

### Implementation of LLA/VLF to Control Load Module Fetching

The LLA (Library Lookaside) function of MVS/ESA manages both Linklist and non-Linklist libraries. Therefore, it is not necessary to place the IOA LOAD library in the Linklist in order to benefit from LLA. Without VLF (Virtual Lookaside Facility), the LLA only maintains direct pointers to modules residing in LLA controlled libraries. The combination of LLA and VLF improves module fetching by keeping modules in virtual storage. If VLF has a copy of a module that is controlled by LLA, no I/O operations are required to locate or retrieve the module from a PDS library.

### Using Program Fetch Optimization Products

These products can usually speed up the process of locating and/or fetching load modules (even when working with a STEPLIB DD statement). If your data center operates a program fetch optimization product (for example, PDSMAN, PMO, QUICKFETCH), this product can control Control-M load module fetching.

### Placing Control-M/IOA Files on Appropriate Disk Packs

The following disk or file characteristics enable Control-M to perform optimally:

- disks that are not very active and are not connected to heavily utilized disk strings and disk channels
- disks that do not contain MVS system files
- disks that do not contain a PAGE or SWAP dataset
- at a multi-CPU site: disks that are not physically reserved (and therefore cannot be physically locked) by other CPUs
- disks whose head movement is minimized by placing Control-M/IOA files near the VTOC
- files (IOA RES, IOA LOG, Control-M AJF and History file) that are split over several disks (after installation)
- disk types that are newer, for example, 3390 and others discussed in "Placing Certain Control-M/IOA Files on Special Disk Devices"

### Placing Certain Control-M/IOA Files on Special Disk Devices

Some sites have special disk devices such as

- solid state (semiconductor) disk devices
- disks with fixed heads
- disk controllers with cache memory

Several Control-M/IOA files are good candidates for placement on these devices.

The (usually temporary) file referenced by DD statement OUT180 is a good example. The first three SYSOUT files of a job submitted by Control-M are read from spool and written to this file for later analysis. A permanent file can be allocated on an appropriate device and defined in DD statement OUT180 to control the placement of this file.

This file is obsolete if Control-M/Restart has been installed.

In DD statement OUT180, some customers specify UNIT=VIO (that is, Virtual I/O) to gain I/O performance improvement through the MVS paging mechanism. You should measure your system's paging performance before considering this.

- active Jobs File (AJF)
- IOA Conditions File (CND)
- Control-M Resources File (RES)
- IOA Log File
  - If disks with fixed heads are available (for example, 3350 disks with fixed-heads, or equivalent), it may be advantageous to place the first track of the Active Jobs file, and/or the first track of the IOA Log file under the fixed-head areas. The first block of the file contains frequently accessed data and pointers that enable direct access to the respective files.
  - If solid-state semiconductor devices are available, it may be advantageous to place the OUT180 file and/or the RES file on them. Other files can also be considered, depending on the capacity of the devices.
  - If disk controllers with cache memory are available, it may be advantageous to place active Control-M/IOA files on disk packs connected to such controllers. We suggest performing tests in order to determine whether the hit rate observed at your site justifies implementing this recommendation. These tests must be performed after choosing the optimal sleeping interval. For more information, see [Choose an Appropriate Sleeping Interval](#) (on page 320).

All of these suggestions have a positive impact on the performance of the Control-M monitor and other Control-M components. They also minimize the likelihood of two Control-M components attempting to access the same resource at the same time.

These suggestions also have a positive impact on the performance of some IOA Online facility screens. For example, optimizing Active Jobs file placement speeds up performance when using Screen 3 of the Online facility. Optimizing IOA Log file placement speeds up performance when using the Screens 5 and 3.L of the Online facility.

## Enlarging Control-M/IOA File Blocksize

Most Control-M/IOA files are created with a predefined blocksize that cannot be changed. For example, the blocksize of the IOA Conditions file (CND), the Control-M Resources file (RES) and the IOA Manual Conditions file (NRS) are set to 32760.

Control-M/IOA LOAD libraries are supplied with a blocksize of 6144. Control-M/IOA source-like libraries are supplied with a blocksize of 3120. These libraries can be reblocked to suit the standards employed at your site. Larger blocksizes reduce I/O, CPU time and elapsed time. However, this does not have a significant impact on the major components of Control-M.

To increase performance when accessing the IOA LOG file, specify a relatively large block size for the file. For more information, see the *INCONTROL for z/OS Installation Guide: Installing*, "Installation steps" > "Specify target configuration parameters" > "IOA log file space calculation."

## Removing Unneeded and Unused SMF Exits

Control-M uses the SYSOUT of jobs to perform post-processing. It does not use SMF exits. To release the system resources they use, remove any unneeded or unused SMF exits from the operating system. This is particularly important if you have migrated to Control-M from a scheduling product that uses SMF exits to perform such post-processing tasks as analysis of the return codes of a step or job.

## Control-M Monitor and JES Considerations

The Control-M monitor uses JES services to receive information about the status of the jobs running in the system.

Control-M tracks all jobs in the JES queue, even though some may await execution due to a lack of system resources (initiators). To prevent this unnecessary overhead, the user may utilize the MAXACTIV parameter in the SELECT section of the CTMPARM member in the IOA PARM library to limit the number of the jobs that Control-M submits by taking into consideration the number of jobs that the Control-M monitor is currently tracking.

This decreases the number of jobs waiting for initiators in the JES input queue and improves the performance of Control-M. The recommended value for MAXACTIV is the number of initiators serving the jobs submitted to Control-M, or a slightly higher number.

## Run Control-M on the Global Processor in a JES3 Complex

When accessing the JES3 status areas and spool queues, access using the global processor is faster and less expensive than through a local processor. Therefore, we strongly recommend running the Control-M monitor on the global processor in a JES3 complex.

## Run Control-M on the CPU Where Most JES2 Activity Is Performed

In a Shared-Spool complex (MAS), one CPU may perform most of the accesses to JES. For example, this can happen when

- all or most of the printers are physically connected to one CPU
- all or most of the jobs are submitted through one CPU
- all or most of the reports are created on one CPU
- all or most of the NJE or RJE lines are connected to one CPU
- one CPU is much stronger (in terms of MIPs) than the others and it effectively monopolizes access to the JES files

If this is the situation at your data center, it is recommend to run the Control-M monitor on the CPU where most of the JES activity is performed. This optimizes the Control-M monitor's communication with JES2.

In general, non-balanced access by different CPUs to JES files can be controlled and balanced through appropriate JES2 parameters.

## JES2PARM Tuning Considerations

- In the CPU on which the Control-M monitor runs, increase the IBM-supplied default (or current) value of PSONUM (number of Process SYSOUT processors) by two or three.
- To avoid performance degradation of Control-M in a Multi-Access Spool (MAS) environment, adjust and tune the following MAS Definition (MASDEF) parameters:
  - In the CPU on which the Control-M monitor runs, increase HOLD and decrease DORMANCY. In all other CPUs, decrease HOLD and increase DORMANCY.
  - The following recommended values are approximations that do not take into account other products that may be sensitive to JES2 utilization rates resulting from changing the current values. The Systems Programmer may want to do further tuning.
    - On the CPU on which Control-M runs, set the following values:
 

```
PSONUM=5
MASDEF HOLD=45,DORMANCY=( 30,150)
```
    - On the other CPUs, set the following values:
 

```
MASDEF HOLD=15,DORMANCY=( 150,500)
```

Note: The HOLD and DORMANCY parameters can be dynamically changed using the following JES2 command: \$T MASDEF,HOLD=*nnnnnnnn*,DORMANCY=(*mmmm,nnnn*)

- For information on avoiding performance degradation of Control-M in a non-MAS environment, see "Member-specific Parameter Recommendations" (for hold and dormancy in the MASDEF statement) in the Accessing the Checkpoint Dataset topic of the IBM manual *JES2 Initialization and Tuning Reference*.

In particular, note the following recommendation made by IBM:

"If running a single-processor, the following parameter specifications might be good initial values because there are no other processors waiting to gain access to the queues:"

```
+-----+
| MASDEF HOLD=99999999, DORMANCY=(10, 500)
+-----+
```

This change enables the JES on the CPU on which Control-M runs to handle Control-M requests more efficiently and thereby avoid delays in Control-M's analyzing a job's ending status.

From the Control-M point of view, there are two JES dependent time intervals:

1. the time interval when the JES checkpoint is available (JES window),
2. the time interval between the JES windows.

The optimal value of the MULTISUB parameter is the smaller of the following two numbers:

- the max number of prepared jobs that Control-M can write into the JES internal reader during an interval (1).
- the max number of jobs that Control-M can prepare for mass submission during an interval (2)

Since time of job preparation is strongly affected by the system operational environment (CPU utilization, I/O time etc.) and also by the JES MAS definitions, it is impossible to say, a priori, how the optimal value MULTISUB should be calculated. Nevertheless it is clear that slowly incrementing the MULTISUB value will have a positive performance effect until reaching an optimal (critical) value. Exceeding such an optimal value might cause some performance degradation.

Note that in any case, better performance is always achieved by choosing some value for the MULTISUB parameter rather than relying on its default value.

## Control-M in a Parallel Sysplex Environment

In a Parallel Sysplex environment with JES2 working in a multi-access spool (MAS) configuration, better Control-M performance may be achieved by using the CTMPLEX facility. For more information, see [CTMPLEX: Control-M for the Sysplex](#) (on page 338).

## Control-M and SMF Processing

Since the Control-M monitor is a long-running job, it may take a long time from when the monitor is stopped until it actually ends, depending on how the customer has set the DDCONS parameter in the SMFPRMxx system PARMLIB member.

When DDCONS is set to YES, long-running jobs may take a long time to end because of the building of SMF type 30 records. If such delays can or do adversely affect the production system, the user should consider setting DDCONS to NO. This setting will bypass the consolidation function for type 30 records, thereby reducing the processing time required to build the records, and thus also the time required to complete the job. For more information, see the IBM manual *MVS Initialization and Tuning Reference*.

## NJE Diagnostic Procedures

An NJE job is a job submitted by the Control-M monitor for execution on a remote node. Control-M can detect the status of jobs running on a remote node, and when these jobs finish executing, Control-M can assign a status to them.

To analyze how a job finished executing, Control-M uses JES services to read the job's output. If Control-M detects a critical error in JES operation, it shuts itself down. This prevents the incorrect submission of jobs due to a JES malfunction.

Errors can occur under the following circumstances:

- Control-M cannot read the job SYSOUT.
- The job returned with a temporary job status because its current job number is not the same as the job number it had when it started. Control-M must know that the job number changed and must change the previous job number to the new one. The Control-M monitor can detect that the original job ID of the NJE job is being used by another job and continue to search for a job to match the new job ID.
- If the assigned job number changes, Control-M may act as if the old job disappeared.
- The job can have more than one sysout when it returns with a temporary job status. This gives it 2 separate ID numbers.
- A job was purged from the spool on the remote node. The following message may be displayed each time Control-M attempts to find the job on the remote node:

HASP693 JOB NOT FOUND

BMC recommends that you do not do purge jobs on the remote node.

- If the remote node is not active or not connected to the home node, the following message may be displayed each time Control-M attempts to find the job on the remote node:

HASP674 SYSTEM UNCONNECTED

This can be rectified by activating the remote node or by reconnecting the home node and the remote node.

To determine the cause of a specific error, it may be necessary to provide the Control-M administrator with specific information about the job. The following suggestions can help resolve the problem:

- Check the maintenance levels of the CTMSUB module and the CTMSPY module.
- Check the job in the Zoom screen (Option Z on the Active Environment screen). Verify that the NJE field is set to Y (Yes) and that the NODE field contains the correct name of the remote node.
- Look at the job's JCL stream and see whether any statement contains parameter 'FREE=CLOSE'.
- Send the Control-M administrator the job SYSOUT and the SDSF screen or the output of any other comparable product showing the SYSOUT datasets.  
The SYSOUT status and whether the job was deleted or purged displays in the SDSF screen. If, for example, the SYSOUT datasets are in the wrong OUTPUT CLASS, Control-M cannot read them.
- Indicate if this problem occurs frequently and whether it occurs for all jobs or for just specific types of jobs.
- Indicate the type of job (for example, cyclic, short or long term, regular, CICS).
- Ensure that parameter ENHNJE (in the CTMPARM member of the IOA PARM library) is set to Y.
- Ensure that the messages \$HASP890, \$HASP608, \$HASP693, \$HASP826, and \$HASP650 are not suppressed. Also, do not suppress messages starting with the name of the remote system.

BMC recommends that you do not purge jobs from the spool on the remote node. However, if a job was purged from the spool on the remote node, you must notify Control-M of the event, by changing the value in the NJE field in the Active Environment Zoom screen (Screen 3.Z) to ' ' (Blank). After a short time, the status of the job changes to Disappeared.

If the remote node is not active or not connected to the home node, you should activate the remote node or reconnect the home node and the remote node. If this is not possible, you must notify Control-M of the event by changing the value in the NJE field in the Active Environment Zoom screen (Screen 3.Z) to ' ' (Blank). After a short time, the status of the job changes to Disappeared.

If the previous suggestions do not resolve the problem, perform the following procedure:

➤ **To open a BMC Customer Support case for an NJE issue**

1. In member CTMPARM of the IOA PARM library, set parameter DBGMCS=Y.
2. Restart the Control-M monitor
3. Set traces 33, 39, and 79 by issuing the following MVS modify command:  

```
F ctm, TRACE=( 33,39,79 )
```

 where *ctm* is the name of your Control-M monitor STC.
4. Reproduce the problem.
5. Reset the CTMPARM parameters to their original value and turn off the traces.
6. Send the following documentation to BMC Customer Support:
  - Job print-screen of 3.Z
  - Complete joblog of Control-M monitor STC
  - IOALOG from the relevant period of time  
(Use IOACPLG1 from IOA.JCL library to copy the log to a sequential file.)
  - Extracts from the syslogs of the system where CTM runs and the remote system
  - NJE job sysout and the SDSF screen (or the output of any other comparable product) showing the sysout datasets

## Assign Appropriate Priority to the Control-M Monitor

Use MVS System Resources Manager (SRM) parameters to assign an appropriate priority so the Control-M monitor can receive enough CPU and other computer resources to perform the necessary tasks.

Appropriate priority must also be assigned to JES, because the Control-M monitor communicates extensively with JES.

Online-oriented sites that run JES with low priority during service hours must increase the priority of JES before main batch processing begins. This can be done automatically by scheduling a CTMOPR started task at the appropriate time to issue an appropriate SET ICS and/or SET IPS command.

## Run the Control-M Monitor as Non-swappable

Set parameter NONSWAPM to Y in member CTMPARM in order to activate the Control-M monitor as non-swappable. For more information, see the Control-M chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

This causes Control-M to be paged-in and paged-out according to a more economical algorithm. In addition, this speeds up the paging process by causing some basic address-space related pages to remain in virtual storage. Non-swapping mode ensures good response for the Control-M monitor, as well as the best overall performance.

If the Control-M monitor is run as swappable, the Control-M status tracking task may get stuck waiting for a JES response. This can happen if the monitor communicates with an overloaded JES.

## Choose an Appropriate Sleeping Interval

The Control-M monitor "wakes up" according to the sleeping interval specified using parameter INTERVLM in member CTMPARM.

As the value specified for the sleeping interval increases, Control-M uses less CPU and I/O for the following reasons:

- The job selection routine is invoked after longer intervals.
- The Control-M monitor checks the status of submitted jobs after longer intervals.
- The Control-M monitor interrogates the Active Jobs file (AJF) after longer intervals for additions or changes that may have been performed from batch or from the IOA Online facility.

However, if the value specified for the sleeping interval is too high, the following can result:

- Jobs may be scheduled with a delay.
- Processing a command entered using the IOA Online facility (for example, to hold a job) may take more time because the Control-M monitor performs the command.

Do not overrate the importance of a job-scheduling delay. In many cases, increasing parameter INTERVLM from three seconds to six seconds can actually provide the same throughput, because many jobs that were submitted by Control-M must wait for an initiator to become available.

The sleeping interval is not a fixed installation parameter. It can be changed dynamically during standard production hours (for example, according to hours, shifts, and so on), by scheduling a CTMOPR started task at the appropriate time. The started task issues the command

---

```
F CONTROLM, INTERVAL=ss[.th]
```

---

where

- *ss* is the interval in seconds
- *th* is the interval in hundredths of seconds

Another aspect to consider when deciding on the value of parameter INTERVLM is avoiding situations where the Control-M monitor is faster than the local JES. This can be recognized when one of the following events occurs:

- Many CTM262S/JES262S messages are issued by the Control-M monitor for different jobs. This happens when the job's SYSOUT is already on the JES output queue, but JES does not allow access to it.
- The Control-M monitor successfully submits a job to MVS, but the job does not appear in any JES queue for a long time, causing the job to receive a status of "disappeared". This situation is rare and only happens if JES is heavily overloaded.

This does not refer to a situation where JES is "stuck." Control-M does recognize such a situation, and therefore does not submit the job.

If this happens at your site, consider increasing the value of parameter INTERVLM.



## Storage Isolation

Storage isolation (also called "storage fencing") limits the number of page frames that can be "stolen" from an address space. You can specify a minimum or maximum WSS (working set size), a minimum or maximum paging rate, or a combination of the two. The related MVS SRM parameters are: CPGRT, CWSS, PPGRT, PPGRTR and PWSS.

Improper specifications can degrade the Control-M monitor's performance and/or overall system performance. For example, if the maximum WSS is too low, the Control-M monitor's performance may suffer.

You only need to consider storage isolation if you experience a serious paging problem in the Control-M monitor address space, causing delays in job scheduling.

In any case, you should not specify a maximum WSS and continue to monitor performance on a periodic basis.

## Tuning the Online Facility

### Preallocate Required Control-M/IOA Files in TSO Logon Procedures

If entry to the Online facility is slow due to allocation problems, consider pre-allocating the required Control-M/IOA files in the TSO Logon JCL procedure, instead of in the Control-M/IOA CLISTs. JCL allocations are faster than TSO dynamic allocations. However, you should only consider doing this if there is no other way to speed up MVS allocations at your site.

### Try to Eliminate TSO STEPLIBs

In general, TSO STEPLIBs may cause performance problems. Whenever a program is to be fetched, CPU cycles and I/O are used to search the STEPLIB directories for the program to be fetched. If the program is not located, an additional search is performed in Linklist. For more information, see [General Tuning Issues](#) (on page 313).

### Use the IOA Online Monitor When Required

If you need to assign different performance groups for work done under the IOA Online facility and other online work, use the IOA Online monitor (for TSO or ROSCOE). For additional information, see the IOA chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

When using the IOA Online monitor, only terminal-related issues are performed under TSO/ROSCOE. All other work is performed in the external server address space.

TSO or ROSCOE users are given their standard performance definitions. The external server address space definition can differ from the MVS SRM (for example, it can have a higher priority).

## Mirror File (Dual Checkpointing Mode) Considerations

The Control-M monitor can work in dual mode. In dual mode, the Control-M monitor maintains duplicate copies of the Control-M Active Jobs file, the Control-M Resources file, and the IOA Conditions file. If a disk crash makes the files inaccessible, the mirror files can immediately replace them.

The DUALDB parameter determines dual mode operation. For more information, see the *INCONTROL for z/OS Installation Guide: Installing*, "Installation steps" > "IOA datasets characteristics" > "Mirror file for IOA conditions" > "Additional parameters."

Because of performance considerations, BMC no longer recommends using the mirror file mechanism. Instead—for backup and recovery—use the Control-M Journaling facility, described in [Journaling](#) (on page 355). By using Journaling, you can avoid the performance loss associated with mirroring, taking advantage of the increased efficiency and integrity features built into modern storage devices.

## Control-M Event Manager (CMEM) Considerations

The overhead required to operate CMEM is insignificant because

- Every WTO message is passed to CMEM by MVS.
- CMEM only tracks \$HASP001, \$HASP100 and \$HASP395 messages (under JES2) or IAT6101, IAT6108, IEF403I, IEF404I, IEF450I, and IEF453I messages (under JES3). In addition, all MVS and JES messages of jobs to be controlled by the above facilities are tracked as well. All other messages are immediately passed back to MVS. When a relevant message is encountered, the following actions are performed:
  - CMEM checks whether the related job or event has been defined in a CMEM table. This search is performed in storage because the CMEM table is loaded into storage when CMEM is initialized.
  - If the job or event has not been defined in a CMEM table, CMEM passes the message back to MVS.
  - If a relevant event is encountered, the CMEM rule passes the FORCEJOB and RESOURCE requests to the Control-M monitor, which performs the requests. The STOPJOB and CONDITION requests are performed by the CMEM monitor.

All CMEM activities (except the last item above) are performed in storage. No I/O or supervisor calls are required. Therefore, no special tuning activities have to be performed and there is no reason to monitor CMEM performance.

Control-M monitor overhead can easily be monitored by any locally employed performance tool.

## IOA Parameters, Control-M Parameters and Optional Wishes

Many Control-M parameters, IOA parameters and optional wishes directly affect Control-M performance and behavior in various areas. For more information about these parameters and wishes, see the customization process for Control-M in the Control-M chapter of the *INCONTROL for z/OS Installation Guide: Customizing*, and the following members:

- IOADFLT in the IOA IOAENV library
- CTMPARM in the IOA PARM library

To optimize Control-M performance and behavior, review and customize the IOA Profile variables described in [Profile Variables](#) (on page 82).

## Single and Multiple CPU Configuration and Support

This section describes how Control-M is implemented under multiple CPU hardware and software configurations. A number of scenarios are provided, relating to specific hardware connections or to specific enterprise connections.

This section also describes the scope of production workload control and various Control-M options that can be used. It does not cover Control-M's entire range of methods and possibilities, but just the most common ones.

The basic Control-M system for both single-CPU and multi-CPU configurations contains the following major components:

- monitor
- online facility
- online monitor (optional)
- utilities
- KSL facility
- CMEM facility (optional)

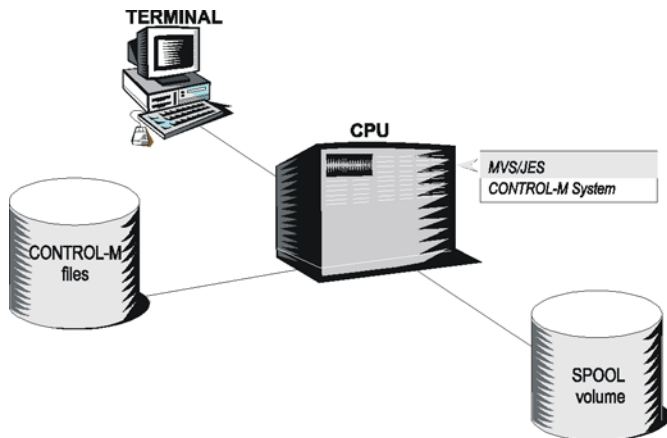
### Single-CPU Configuration

This section describes how a single CPU is configured with both single and multiple Control-M systems.

#### Single-CPU Configuration with Single Control-M System

The following figure shows a Single-CPU configuration with a Single Control-M System:

**Figure 33** Single-CPU Configuration with Single Control-M System



In the configuration illustrated above, Control-M is running on one mainframe computer. It includes

- at least one disk volume containing the JES Spool
- at least one disk volume containing the IOA Core and Control-M Repository
- at least one terminal capable of operating the IOA and Control-M Online facilities

Standard terminals of the 3270 family are supported as well as other devices that emulate a 3270 terminal (such as a PC with 3270 simulation or a VT100 with 3270 simulation).

IBM DBCS terminals (or equivalent), which provide Japanese language (Kanji) capability, are supported as well.

Optionally, an RJE (Remote Job Entry) workstation (or an intelligent system that emulates an RJE station) can be connected to the mainframe. Under JES3, the same facility is called RJP (Remote Job Processing).

The following Control-M features support RJE:

- The Control-M Event Manager (CMEM) can be used to
  - acknowledge and handle jobs submitted from RJE to MVS
  - acknowledge the creation or deletion of datasets by jobs that originated from RJE
- Control-M SYSOUT options support the routing of SYSOUTs to RJE.
- RJE jobs can invoke utility IOACND, or other IOA and/or Control-M utilities using a JCL step to communicate with Control-M.

## Single-CPU Configuration with Multiple Control-M Systems

A configuration in which two Control-M systems operate is common because many sites install a Control-M production system and a Control-M test system. We recommend operating a separate Control-M test system for testing new versions or options before applying them in the Control-M production system. Usually, the Control-M production system and Control-M test system are separate systems that use separate libraries, separate databases, different JCL procedures, and so on.

In some cases, there may be good reasons for operating two or more Control-M production systems. For example, a service bureau may need to provide distributed scheduling for two or more clients.

Two Control-M systems can communicate with each other by scheduling special jobs. For example, Control-M system A may schedule a special job that invokes utility IOACND, which adds a prerequisite condition to the IOA Conditions file base of Control-M system B. This prerequisite condition, in turn, triggers the submission of a job by Control-M system B.

Subject to system resource limitations any number of Control-M systems can be operated concurrently on a single mainframe.

For additional information about how to activate more than one Control-M monitor, see the Control-M chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

Each Control-M system uses a separate CMEM subsystem. Subject to system resource limitations, any number of CMEM subsystems can be operated concurrently. However, a job can be handled by only one CMEM subsystem.

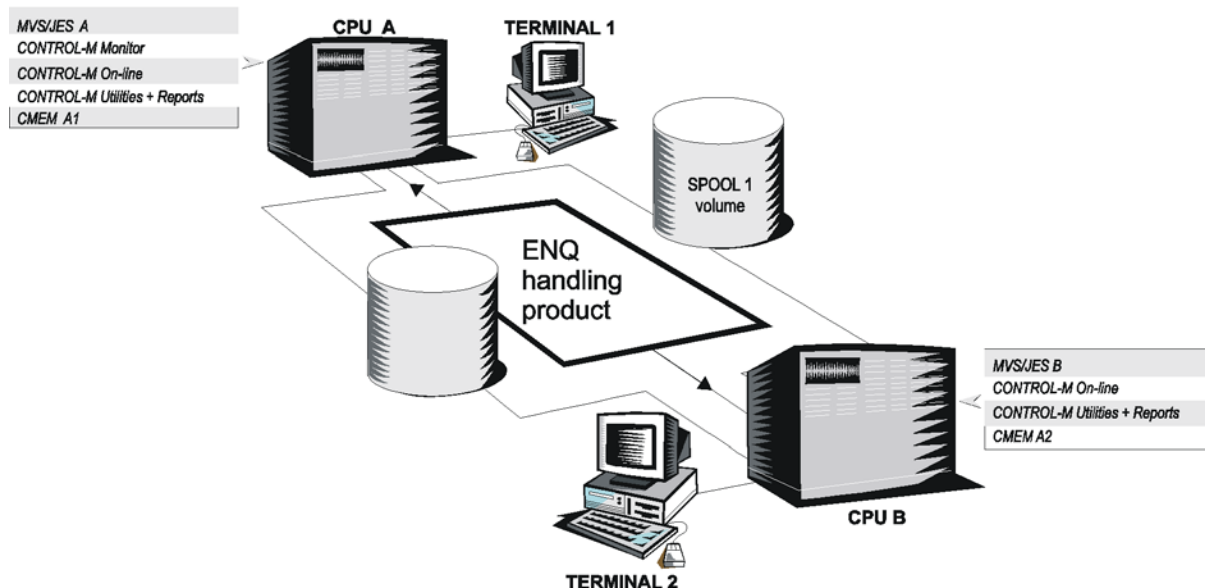
Different (several) CMEMs can be used to acknowledge job-arrival or job-ended events for a job. However, use only one CMEM to acknowledge ON DSNEVENT or ON STEP events.

## Multi-CPU Configuration

### Shared Spool Configuration with ENQ-Handling Product

The following figure shows a Shared-Spool Configuration with an ENQ-Handling Product:

**Figure 35 Shared-Spool Configuration with an ENQ-Handling Product**



The term "Shared-Spool" refers to "JES2 Multi-Access Spool (MAS)" or "JES3 Complex" connections between two or more MVS systems.

A Shared-Spool configuration consists of two or more JES systems sharing JES input, job, and output queues. The Shared-Spool must reside on one or more disk volumes that are shared by (connected to) all relevant mainframes.

The above diagram shows a basic Shared-Spool configuration consisting of two mainframes.

The following discussion also applies to Shared-Spool configurations with more than two mainframes.

A single Control-M monitor is sufficient for handling the entire Shared-Spool complex. The monitor submits all jobs to CPU A but the jobs run under the appropriate CPU (CPU A or CPU B).

A job can be designated to run on a specific CPU based on the value of parameter CLASS in the JOB statement. If a job submitted by the Control-M monitor specifies a CLASS that is only served by CPU B, JES automatically designates the job to run on CPU B.

A job can also be designated a job to run on a specific CPU through an appropriate JES statement, such as the following:

```
/*JOBPARM SYSAFF for JES2;
//*MAIN SYSTEM for JES3.
```

If a job submitted by the Control-M monitor requests (through such a statement) to run on CPU B, JES automatically sends the job to CPU B.

CLASS and SYSAFF/SYSTEM specifications can be hard-coded in the job's JCL, or can be determined dynamically and set by the Control-M monitor during job submission.

For information on dynamically setting up CLASS and SYSAFF/SYSTEM specifications using the AutoEdit facility, see the examples of controlling the target computer by class and system affinity in the JCL and AutoEdit facility chapter of the *Control-M for z/OS User Guide*.

Control-M supports dynamic CPU workload balancing. This type of balancing is achieved through the use of quantitative resources and the Automatic Tape Adjustment facility. For more information, see the description of the RESOURCE Runtime scheduling parameter in the job production parameters chapter of the *Control-M for z/OS User Guide*.

Assuming that the IOA and Control-M software, Core, and Repository reside on a disk that is shared by the two CPUs, the Online facility can be invoked under both CPUs. For the same reason, the various IOA and Control-M utilities and reports can be operated on both CPUs.

Special steps must be taken in order to simultaneously update a file from two CPUs. Before Control-M updates the Repository, it issues a special ENQ with a scope of SYSTEMS. An ENQ-handling product (such as GRS or MIM) must be employed in order to pass the ENQs to all CPUs and synchronize the updates. If no ENQ-handling product is employed, data integrity is jeopardized.

Ensure that the ENQ-handling product actually handles the Control-M ENQs. The easiest way to verify this is to enter Screen 3 of the Control-M Online facility under CPU B, and look at the upper right corner. If the Control-M monitor is up under CPU A, the status "UP" is displayed.

The Control-M Event Manager (CMEM) can acknowledge the arrival or ending, of jobs or started tasks, accesses to dataset, and changes to dataset disposition (allocation, deletion, cataloging and uncataloging) performed by jobs or started tasks. If you want to receive these acknowledgments on both CPU A and CPU B, the CMEM component must operate on both CPUs.

Additional Control-M options provide special support for the Shared-Spool environment

- SHOUT (notification) messages can be issued to users on any CPU. For further information about parameter SHOUT, see the job production parameters chapter of the *Control-M for z/OS User Guide*.
- A started task (STC) can be scheduled on any CPU. For further information about parameter MEMLIB, see the job production parameters chapter in the *Control-M for z/OS User Guide*.
- Operator commands can be issued in any CPU. For further information about the IOAOPR utility, see the *INCONTROL for z/OS Utilities Guide*.

Assuming that the Control-M monitor runs on CPU A and a command is to be issued to CPU B, any of the following methods can be used:

- The monitor can schedule a job or started task to run on CPU B and invoke procedure IOAOPR to issue the command.
- The monitor can schedule the IOAOPR STC (or job) to run on CPU A and issue the command in such a way that it is passed to CPU B (Under JES2, use the \$M command. Under JES3, use the \*T command.)
- Sample Exit IOAX034A in the IOA SAMPEXIT library enables the user to issue operator commands by running a dummy job without scheduling a job or a started task using SHOUT requests.

This sample exit is suitable for all JES2 and JES3 versions (assuming that the Control-M Monitor runs under the global JES3 processor).

You should use the first method for the following reasons:

- The command always reaches CPU B.
- Control-M analyzes the SYSOUT of the scheduled job or started task.
- Checks whether the job or started task ran successfully or not.
- This method provides advantages from a security point of view.

Control-M job statistics are maintained separately for each CPU. These job statistics are used as input for the Control-M Simulation and Forecasting facility. These statistics can be viewed in Screen 3.S.

From a technical point of view, the Control-M monitor can run under any CPU. For performance considerations, see [Tuning Recommendations](#) (on page 312).

## Shared Spool Configuration – Without an ENQ-Handling Product

This environment is identical to the previous environment except that no ENQ handling product is employed. Another difference is that the shared Spool might or might not be connected to CPU B.

You should not use this configuration.

Only one Control-M monitor is required for handling the entire shared SPOOL complex. Aside from the following restrictions, all the capabilities also apply to this configuration:

- To avoid jeopardizing data integrity, the Control-M Repository must not be updated from CPU B. Therefore, all Control-M components (Monitor, Newday procedure, utilities, KSLs that update IOA and Control-M files, and so on) must run exclusively on CPU A.
- If the optional CMEM facility is operated on both CPU A and CPU B, CMEM must be given read access to the IOA LOAD library and Control-M monitor to-subsystem Communication file plus write access to the subsystem-to-Control-M monitor Communication file. All files that are required by CMEM must reside on a shared disk. This shared disk does not need to contain general IOA and Control-M files. (CMEM can operate in a multi-CPU environment without an ENQ handling product.)
- To make sure that Control-M files are not updated from CPU B, one or both of the following options must be implemented:
  - Option 1: Use your site's security product (RACF, ACF2 or Top Secret) to deny write or update access to the IOA and Control-M files from CPU B.
  - Option 2: Vary off-line (under CPU B) the disks on which IOA and Control-M files reside. This method is applicable only if the disks do not contain other files. There may also be a problem if CMEM is operated.

Option 2 is the most effective method, but may be difficult to implement at most sites, because Control-M uses only a portion of a disk and does not require a dedicated disk. Option 1 is the easiest to implement at most sites.

As illustrated in the diagram above, terminal TERM 2 is physically connected to CPU B. However, this terminal can be used to operate the IOA Online Facility.

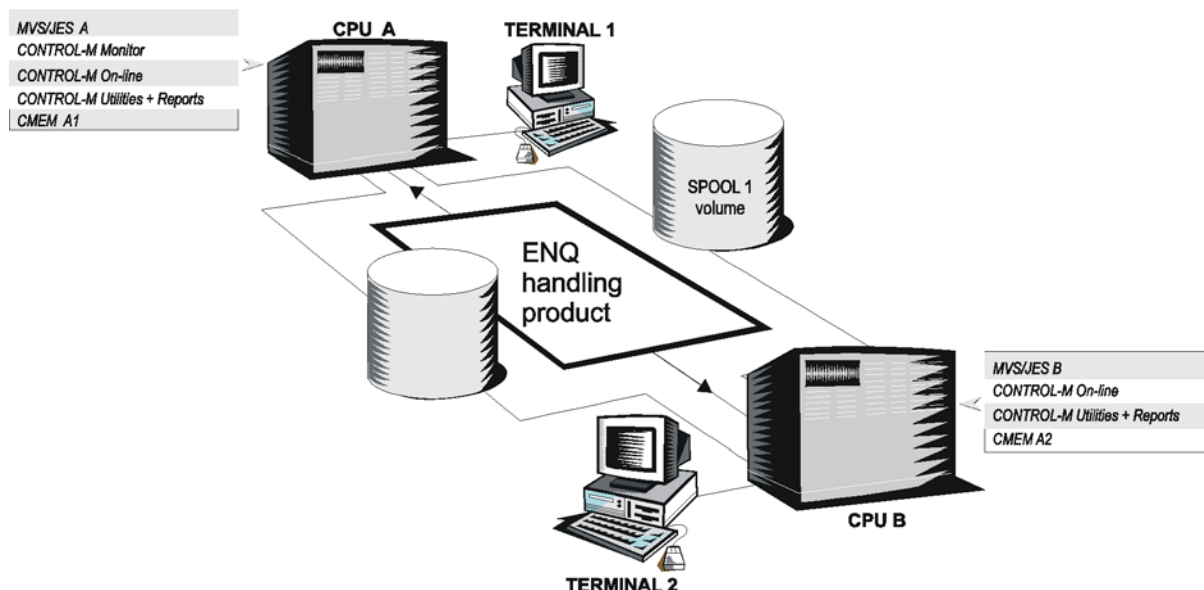
If CPU A and CPU B maintain an appropriate cross-domain SNA connection through a CTC, 37xx communication controller (or equivalent) or Token Ring connection, then the terminal user can log on to VTAM application running in CPU A and invoke the IOA Online Interface. Relevant VTAM applications are: TSO, ROSCOE, IOA VTAM monitor, CICS, IMS/DC, and any VTAM application that supports the IOA Online Facility.

## Shared-Spool Configuration with Multiple Control-M Production Systems

This environment might or might not use an ENQ-handling product. DISK 1 may or may not be connected to CPU B. DISK 2 may or may not be connected to CPU A.

The following figure shows a Shared-Spool configuration with Multiple Control-M Production Systems:

**Figure 37 Shared-Spool Configuration With Multiple Control-M Production Systems**



Some users employ two Control-M production systems in a Shared-Spool environment. Each system employs a separate Repository. Because a single Control-M system is sufficient for controlling the whole Shared-Spool environment, two production systems are not required and, in fact, increase the requirement for disk space, resource consumption and maintenance. However, the following examples describe situations that can justify using two Control-M production systems.

## Examples

### Example 1

Some sites are service-bureaus that dedicate a whole mainframe to one customer.

If each mainframe in a Shared-Spool environment is dedicated to a different customer and each customer requires the services of Control-M, then it is desirable to distribute the scheduling of production work and operate a separate Control-M system for each customer.

### Example 2

A bank operates two CPUs in a Shared-Spool environment. Each CPU is used for a different task – one handles activities related to the stock market; the other for handles all other activities of the bank. To maximize reliability and availability the bank operates two separate Control-M production systems. When one CPU goes down (for any reason), the other continues performing its tasks.



These two Control-M systems communicate with each other by scheduling special jobs. For instance, Control-M system A can schedule a special job that invokes the utility IOACND to add a prerequisite condition in the IOA Conditions file of Control-M system B. This prerequisite condition can in turn trigger the submission of jobs by Control-M system B.

## CMEM Operation

If each CPU is fully controlled by its Control-M system, only one CMEM subsystem is required on each CPU. The CMEM that is part of Control-M system A runs on CPU A. The CMEM that is part of Control-M system B runs on CPU B.

However, if each Control-M system must acknowledge events that might occur under both CPUs, each CPU must operate two CMEM subsystems (one for Control-M system A and the other for Control-M system B). However, a job can be handled only by one CMEM subsystem.

The following table shows the number of CMEM subsystems needed for handling events:

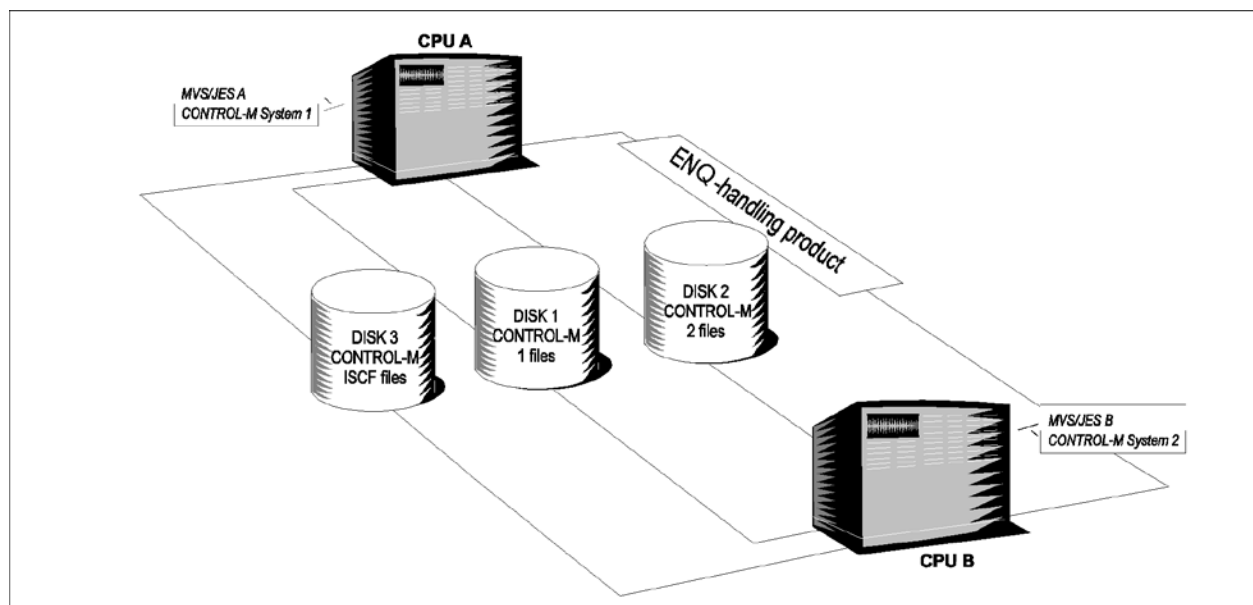
**Table 119      Number of CMEM Subsystems Needed for Handling Events**

| Event         | Number of CMEM Subsystems |
|---------------|---------------------------|
| ON JOBARRIVAL | All CMEM Subsystems       |
| ON JOBEND     | All CMEM Subsystems       |
| ON DSN        | One CMEM Subsystem        |
| ON STEP       | One CMEM Subsystem        |

## Multi-CPU Configuration With Shared-DASD Only

The following figure shows a Multi-CPU configuration with Shared DASD only:

**Figure 38 Multi-CPU Configuration with Shared DASD Only**



This configuration consists of two mainframes that only employ shared DASD (that is, there is no shared Spool). Each CPU runs its own Control-M system.

DISK 1 may or may not be connected to CPU B. DISK 2 may or may not be connected to CPU A. The IOA/Control-M Core and Repository do not need to reside on a shared disk.

However, a shared IOA Condition file is necessary to support this environment. It enables communication between two Control-M systems that run in different CPUs and are not connected using a shared Spool.

Communication is established by sharing prerequisite conditions. These shared prerequisite conditions enable the two Control-M systems to know the status of production work in both CPUs.

The two CPUs must employ a global ENQ-handling product (such as GRS or MIM). For further information see the SHRONAM parameter in the IOA chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

## CMEM Operation

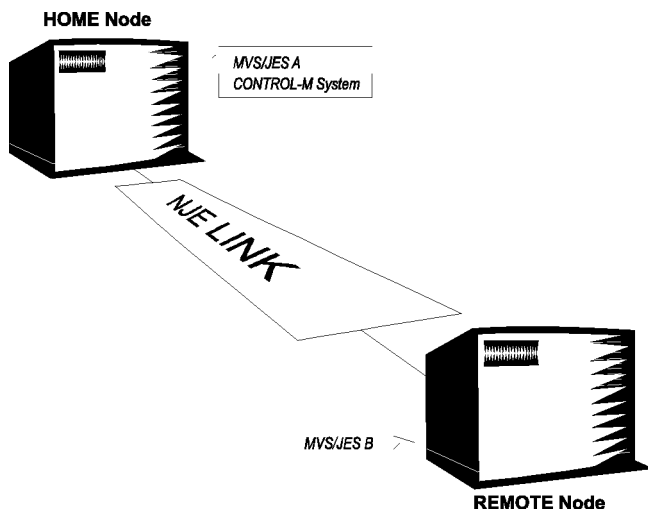
If each CPU is fully controlled by its Control-M system, only one CMEM subsystem is required on each CPU. The CMEM that is part of Control-M system A runs on CPU A. The CMEM that is part of Control-M system B runs on CPU B.

However, if, each Control-M system must acknowledge events that may occur under both CPUs, then each CPU must operate two CMEM subsystems (one for Control-M system A and the other for Control-M system B).

## NJE Network of MVS Nodes

The following figure shows a NJE Network of MVS Nodes:

**Figure 39 NJE Network of MVS Nodes**



## MVS-to-MVS NJE Connection

This diagram shows a network consisting of two nodes. For this discussion, the node that operates the Control-M system is called the Home node. All other node are called Remote nodes.

Many Control-M sites employ a network consisting of two MVS computer systems (nodes) connected using an NJE (Network Job Entry) link.

This type of network is usually used to connect two z/OS computers that are distant from each other. However, some sites use this type of network between two CPUs in the same room for security reasons or during a transitional phase.

To make use of and control such a network, Control-M may run on one CPU (called the Home node) and submit selected jobs to another CPU (the Remote node). The jobs run at the Remote node and the SYSOUT (or the SYSDATA) is returned to the Home node for analysis by Control-M.

For a more detailed discussion on this subject, see member DOCMNJE in the IOA DOC library.

The Remote node can operate a separate Control-M system. In this case, production work in the Remote node must be controlled by its own Control-M system. However, the Home node can still send selected jobs to the Remote node.

Each Control-M system can communicate with the other by submitting special jobs to the other CPU. For example, a special job may invoke utility IOACND to add, delete or check for the existence of a prerequisite condition.

The following Control-M options provide special support for the NJE environment:

- issuing a SHOUT (notification) message to users in a Remote node
- scheduling a started task (STC) in a Remote node
- issuing operator commands in a Remote node
- maintaining job statistics by Control-M
- handling jobs originating in the Remote node operating CMEM in the Home node

If an enterprise network consists of three MVS nodes (named Node A, Node B, and Node C), the number and location of Control-M systems that must be employed depends on the structure and goals of the enterprise.

A single Control-M system is sufficient to submit production work to the whole network. However, specific organizational structures or goals may make it desirable to operate more than one Control-M system. If the enterprise operates in a centralized manner, a single Control-M system may be sufficient. If not, multiple Control-M systems might be more appropriate.

## Availability considerations

Control-M may be affected by events occurring on the node where Control-M runs. For example, system down (regular maintenance or system crash), disk crash, and line-down problems.

If Control-M is employed on a single node, such events affect the whole network. However, if, each node employs its own Control-M system, only one part of the network is affected.

## Performance considerations

If many jobs are to be transferred through the communication lines, multiple Control-M systems must be considered (to cut down the communications overhead).

The overhead for sending jobs is usually insignificant. It is usually jobs' reports that utilize the communication lines the most when they are sent back. Control-M only requires the SYSDATA to be sent back, which is also insignificant in regard to the communications overhead).

## Disaster and backup planning

Overall disaster and backup planning requires that important production work be switched within a short time from one node to another. If each node already employs its own Control-M system, the transfer can be performed quickly and easily.

## Special Considerations

### Mainframe with LPAR

The LPAR (Logical Partitions) feature in an IBM mainframe allows a site to divide its mainframe into "partitions" and run multiple operating systems in parallel.

For our purposes, we can treat each partition as a standalone mainframe computer and we can treat the processor complex as a type of "multi-CPU configuration."

To determine how Control-M controls the production work in two logical partitions, we need to determine what connection (if any) exists between the two partitions. Relevant connections are: shared SPOOL, shared-DASD only, and NJE.

If an MVS system runs in both partitions and the only connection between them is shared-DASD, then the description under [Multi-CPU Configuration With Shared-DASD Only](#) (on page 330) also applies to this configuration.

In addition, these considerations apply to other supported CPUs with hardware partitioning capabilities, which can be operated in either "single image mode" or "partition mode."

### Operating MVS Systems Under VM

For information about this topic, see [Control-M VM Support](#) (on page 300).

### Support of Other Platforms (Such as VM, DOS/VSE, AS/400, DEC, HP)

This discussion deals only with Control-M z/OS products. For information about other products, see the appropriate Control-M publications.

This diagram deals with a multi-CPU environment that includes one or more non-z/OS computers. The most common non-z/OS platforms are: VM, DOS/VSE, AS/400, DEC's VAX/VMS, and HP.

The following discussion shows how a z/OS-based Control-M system can contribute to this environment:

The z/OS-based Control-M can

- schedule work in the non-MVS system
- control production work that is scheduled by a non-MVS system to run on the MVS system
- trigger events on the non-MVS system
- interact with any hardware that supports an "appropriate connection" to the z/OS computer

Some of these "appropriate connections" are listed in the following topic.

### RJE/RJP

Many systems use hardware and software to emulate an RJE station connection to an MVS system. For example, the following systems can emulate an RJE station: VM/RSCS, VSE/POWER version 1, DECNET/SNA RJE, AS/400 RJE, and HP SNA/NRJE.

Control-M has several features that support RJE, such as

- Control-M Event Manager (CMEM), which can be used to acknowledge and handle jobs submitted from RJE. CMEM can be used to acknowledge the creation or deletion of datasets by jobs that originated from RJE.
- Control-M SYSOUT options, which can support the routing of SYSOUTs to RJE. RJE jobs can use utility IOACND or other IOA/Control-M utilities to communicate with Control-M.

## NJE (SNA)

MVS/JES can set up an NJE connection with non-MVS systems that employ compatible networking facilities. For example, MVS/JES NJE connections can be set up with IBM VM/RSCS, IBM VSE/POWER version 2, IBM AS/400 using VM/MVS Bridge, and DEC VAX/VMS systems (through Interlink or Jnet).

An NJE connection provides the ability to transmit and receive jobs, in-stream datasets, sysout datasets, commands, and messages from one computer system (node) to another.

The ability to send in-stream datasets using jobs is limited by data structure, recovery capabilities, reliability, and so on. Therefore, most sites that require data transfer use an appropriate file transfer program instead.

Control-M can be used to send jobs and files to the NJE node. The best way to do this is for Control-M to submit an MVS job that produces a SYSOUT file with the appropriate non-MVS destination.

The same methods of operation that support RJE (for example, usage of CMEM) can be used to transfer jobs or data from the NJE node to the MVS system.

## SNA Connections for Terminal Access

If basic SNA connections can be established between the two systems and if the non-z/OS platform employs appropriate terminals, a terminal user connected to the non-z/OS platform can log on to a VTAM application running on the z/OS platform.

This capability enables a terminal user to invoke the IOA/Control-M Online facility by logging on to VTAM applications (such as TSO, CICS, IMS/DC, the IOA VTAM monitor, or any other VTAM application that supports the IOA/Control-M Online facility). This method makes all of Control-M's tracking and control options available to the user.

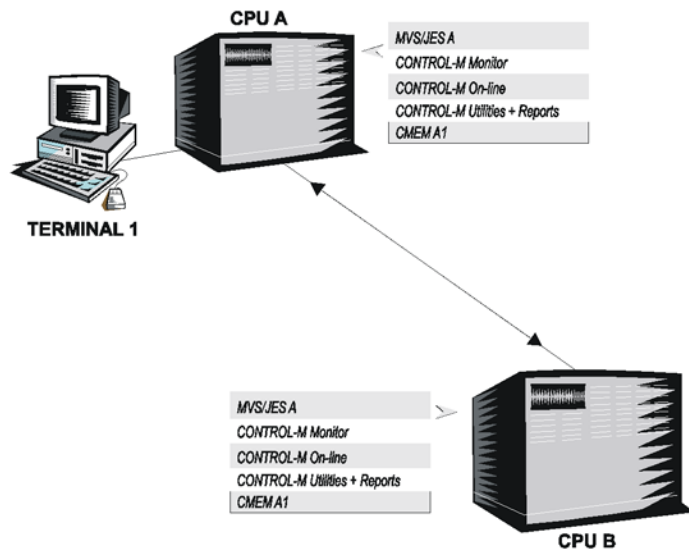
For example, users of the following terminals can access VTAM applications running under MVS: DECnet, HP, AS/400, VM (through VM/VTAM), and VSE (through VSE/VTAM).

## Support of Network Software

The following diagram deals with a multi-CPU environment that consists of an OS/390 platform running Control-M and another platform that can be an OS/390 or a VM, VSE, AS/400, VAX/VMS, TANDEM/GUARDIAN 90, or PC platform.

Both platforms operate a Network Management product and/or a File Transfer product.

The following figure shows support of Network Software:



In this environment, the Control-M system can

- transfer data to the other system
- transfer alerts to the other system
- trigger events in the other system
- schedule work in the other system

Control-M can interact with various Network Management and File Transfer products that use existing connections between the z/OS platform and the other platform.

## Network Management Products

Systems that are connected by Network Management products can use this connection to transfer triggers (events) from the Control-M system to another SNA system.

Control-M can schedule a dummy job that sends a SHOUT message to the system console. The message can be captured by NetView, which triggers a command that is transmitted by NetView to a remote VSE system console, or through a TAF terminal to a remote application such as IMS/DC or CICS.

## File Transfer Products

Various File Transfer products can be used under MVS to transfer data from MVS to other systems, and vice versa.

These File Transfer programs include FTPSERV from IBM, and XCOM and CONNECT DIRECT (formerly NDM) from Computer Associates (CA). In addition, the TSO/E TRANSMIT and RECEIVE commands can be used to send and receive files.

Each product has its own transfer method and may or may not have easy-to-use interfaces and exits. We provide some general tips on how Control-M can interface with these products. We recommend that you check with the appropriate software representative to determine whether these tips are suitable for your environment.

## Tips for Interfacing with File Transfer Products

- Control-M can periodically trigger a file transfer from the MVS system to the other system. This technique can be used to pass data to the other system. In some cases, the transferred data can trigger a process in the target system.
- All File Transfer products can be interfaced using batch and/or TSO. Control-M can submit a job that interfaces with the File Transfer product by invoking the appropriate program under batch or by operating TSO Batch and invoking the File Transfer product's TSO interface.
- The CMEM facility can be used to acknowledge the receipt of a file from another system and, for instance, to order a job to handle that file (or add a prerequisite condition indicating that the file arrived). CMEM can only acknowledge the receipt of files under the following conditions:
  - The file is received by a started task (STC) or job. Most File Transfer products use an STC for this functions. However, TSO RECEIVE and TRANSMIT operate under TSO.
  - The File Transfer product uses regular MVS ALLOCATION/ DEALLOCATION facilities (that is, SVC 99) to create the new file.

CMEM can acknowledge the receipt of files. However, it cannot determine whether the file transfer process was successful or not.

If the File Transfer product provides appropriate exits, these exits can be used to inform Control-M of events occurring within the File Transfer product.

For example, if the other system has a "File Receipt" exit, utility IOACND can be called by this exit to add a prerequisite condition that informs Control-M that a file has been received.

Some products provide the option to submit a job after the file transfer process has finished. Such a job can invoke utility IOACND to add a prerequisite condition to the IOA Conditions file.

For information about the built-in Control-M interface to CONNECT DIRECT, see [CONNECT DIRECT Support \(Formerly NDM Support\)](#) (on page 289).

## Automatic Restart Management Support

Automatic restart management can reduce the impact of an unexpected error to a system program by restarting it automatically, without operator intervention. In a Sysplex environment, a system program can enhance its own recovery potential by registering as an element of the automatic restart management function of the cross system coupling facility (XCF).

To provide program recovery through automatic restart management, your installation must activate a policy through the SETXCF START command. This can be an installation-written policy or part of the IBM-supplied policy defaults. Because an installation-written policy may affect your program, you must understand how your installation uses automatic restart management for recovery in a Sysplex. Details of the automatic restart management function are described in the section of IBM manual *MVS*

*Programming: Sysplex Services Guide* that discusses using the automatic restart management function of XCF.



In general, the operating system restarts an element under the following conditions:

- when the element itself fails—in this case, the operating system restarts the element on the same system
- when the system on which the element was running unexpectedly fails or leaves the Sysplex—in this case, the operating system restarts the element on another system in the Sysplex. This is called a cross-system restart.

The operating system will not attempt to restart an element if

- the element has not yet registered as an element of automatic restart management
- the element is cancelled through a CANCEL, STOP, or FORCE command (without the ARMRESTART parameter specified)
- JES is down or has indicated that the element should not be restarted
- the element has reached the restart attempts threshold specified in the policy
- the policy indicates that this element should not to be restarted
- access to the ARM couple data set was lost

## Installing and Implementing Automatic Restart Management for Control-M

### Automatic Restart Management and Control-M Failure

If ARM support is enabled and Control-M fails unexpectedly, the following message is issued when the operating system automatically restarts Control-M:

**CTM181I AUTOMATIC RESTART IN PROGRESS AFTER UNEXPECTED FAILURE**

### Restart Parameters

There are several parameters you can choose to determine where, under what circumstances, and how many times, Control-M is to be restarted. Some of these restart parameters are described in the following table:

**Table 120 Restart Parameters**

| Parameter        | Description                                                                                                                                                                                             |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TARGET_SYSTEM    | Systems on which Control-M can be restarted in a cross-system restart.                                                                                                                                  |
| ELEMENT          | Element name that represents Control-M. This must exactly match the ARMELMNT CTMPARM parameter.                                                                                                         |
| RESTART_ATTEMPTS | Maximum number of times that the operating system should attempt to restart Control-M. This limit prevents the operating system from continually restarting an element that is recursively terminating. |

| Parameter      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TERMTYPE       | <p>Specifies under which condition the operating system should restart Control-M. Valid values are:</p> <ul style="list-style-type: none"> <li>ALLTERM—Indicates that Control-M should be restarted if the address space terminates, or if the system terminates.</li> <li>ELEMTerm—Indicates that Control-M should be restarted only if the address space terminates.</li> </ul>                                                                      |
| RESTART_METHOD | <p>Specifies the command text that the operating system is to use to restart the element. The statement RESTART_METHOD (BOTH,PERSIST) indicates that the operating system is to use the command text that previously started Control-M.</p> <p>When setting up an ARM policy, do not use this parameter. For more information on when to use this parameter, see <a href="#">Automatic Restart Management and Control-M Failure</a> (on page 337).</p> |

To obtain information about elements of the automatic restart manager while the system is active, you can issue the D XCF,ARMSTATUS,DETAIL MVS operator command. For more information about this command, see the discussion about displaying cross system coupling facility (XCF) information, in the IBM manual *MVS System Commands*.

## Example

The following is an example of an addition to the existing automatic restart management policy of an installation. The example specifies a target system and directs that Control-M should be restarted only if the system program terminates, but not when the system terminates.

```
RESTART_GROUP(CONTROLM)
```

```
    TARGET_SYSTEM(OS35)
```

```
    ELEMENT(CONTROLM*)
```

```
        TERMTYPE(ELEMTerm)
```

## CTMPLEX: Control-M for the Sysplex

CTMPLEX is a new architecture of Control-M, specifically designed to work in a Parallel Sysplex environment with JES MAS (multi-access spool) configuration. It gives Control-M multi-tasking capabilities across the Sysplex, supplies multi-CPU dynamic workload balancing capabilities, and provides a single Sysplex view of the entire production environment. The product offers a comprehensive production solution, enabling users to introduce Sysplex technologies into the business environment without risking the production throughput.

The scheduling benefits that are offered by Control-M using CTMPLEX in a large Sysplex environment include the following:

- large-scalability Sysplex scheduling support
- enterprise-wide view
- availability and recovery
- more efficient workload balancing

## Large-Scalability Parallel Sysplex Scheduling Support

CTMPLEX (the Control-M Parallel Sysplex support configuration) provides users with management capabilities over the entire Sysplex environment.

When utilizing a small Sysplex environment (for example, up to five Sysplex images), a single Control-M monitor can support all CPUs, all controlled from a single tracking and control screen.

For large-scale Sysplex environments, CTMPLEX utilizes its advanced Sysplex management. The product activates a Control-M Global Sysplex Manager (GSM) on one of the MVS images in the Sysplex environment. The system administrator can then select any or all of the remaining Sysplex images and activate Control-M Local Sysplex Monitors (LSM) on those images. The Control-M GSM has exclusive access to the Control-M Repository (Active Jobs file, Resources file, and so on), and controls the workload balancing among all Control-M LSMs. Each LSM receives portions of work from the GSM, performs the work and reports the results to the GSM.

This Parallel Sysplex Control-M configuration allows the product to take advantage of all available resources in the Sysplex, such as CPUs, JES, and the Coupling facility, and to handle any number of jobs that may run in the Sysplex at any time. Each Control-M's LSM controls and monitors a portion of the active jobs that runs in the Sysplex. Consequently, the workload is divided among all available CPUs and JES components, preventing potential bottlenecks.

## Enterprise-wide View

Although the GSM and the LSMs run on different Sysplex images, IOA screens provide a view of the entire enterprise, regardless of the system used to log onto the Sysplex. This cross-CPU viewing capability allows users to make all definitions (jobs, resources, and so on) in the same user interface and store them in a common database, regardless of the system on which the definitions actually take effect. Users are also given the power to track and control multiple systems and applications, regardless of the image on which the tasks are executed. A Control-M user, for instance, can track and control production across the entire Sysplex by logging on from any system in the Sysplex, regardless of whether the Control-M monitor is active on that system.

## Availability and Recovery

When activating CTMPLEX, the product uses the Coupling Facility services for communication between the Control-M's GSM and LSMs, assuring high speed and reliable information transfer between the GSM and all LSMs. The information exchange between Control-M components can also be stored and maintained by the Coupling Facility itself for recoverability if Coupling Facility malfunction occurs.

Using the Coupling facility services, the Control-M's GSM automatically detects all LSM or communication failures, assuring that all work associated with the problematic LSM are distributed among other available LSMs until the failure has been corrected. In case of a Control-M's GSM malfunction, the LSM with the highest PRIORITY value replaces the GSM instantaneously to assure an uninterrupted production operation in the Sysplex. When the original GSM restarts, it takes over the GSM function again, since it has the highest PRIORITY value, while the current GSM resumes its LSM role.

If PRIORITY values are changed during the execution of the monitors, the NEWPLEX modify command must be issued to ensure all monitors are working with the same CTMPLEX configuration, and to force the highest priority monitor to become the GSM. Stopping and starting monitors without the NEWPLEX command, may result in a situation where the monitor that is best suited to function as the GSM does not have the highest priority and therefore will only function as an LSM.

CTMPLEX's flexible design and effective operation allows the product to handle the entire Sysplex Batch workload 24x7, without requiring shutdown time for product maintenance. Information is not lost even if one of the Control-M monitors or LPARS in the Sysplex is not available. The remaining Control-M monitors automatically updates themselves with any changes that occurred while a Control-M monitor is unavailable.

In the case of a failure of the Control-M's GSM, none of the LSMs should be stopped. Just cancel the GSM. This will cause one of the LSMs to switch to GSM, which preserves the CF structure and the data (jobs updates) saved in the CF, and allows the new GSM to read data from the CF structure and perform the required AJF updates.

## Glossary of CTMPLEX Terms

**Table 121**      **Glossary of CTMPLEX Terms**

| Term                                   | Definition                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTMPLEX                                | Multiple Control-M monitor configuration under an MVS Parallel Sysplex with a JES MAS (multi-access spool) environment.                                                                                                                                                                                                                                                                               |
| Control-M Global Sysplex Manager (GSM) | The GSM is the one (and only one) monitor that uniquely serves the entire Sysplex. Its main activities include: Select and post-processing phases (not including SYSOUT and DO SYSOUT operations); handling dummy jobs and SMART Table Entities; I/O against the main databases (AJF, CND and RES); processing external events (Hold, Free, Delete, and so on) and executing CMEM/Control-O requests. |

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control-M's Local Sysplex Monitor (LSM) | <p>The LSM is a Local monitor, started on any Sysplex member (but only one Control-M monitor on each Sysplex member). This monitor performs the SUB (submitting) and SPY (follow-up on jobs, reading and analyzing of job SYSOUT) phases of each job, including the SYSOUT and DO SYSOUT functions of the post-processing phase.</p> <p>The first Control-M monitor that is started in the Sysplex becomes the GSM. Every Control-M monitor started after that acts as an LSM, unless it has a higher PRIORITY, in which case it takes over the role of the GSM, while the first Control-M monitor becomes an LSM. This global monitor selection process continues, so that ultimately the Control-M monitor with the highest PRIORITY value functions as the GSM. Only one Control-M monitor may run on each Sysplex member.</p> |
| Coupling Facility (CF) Usage            | The Coupling Facility list structure is used as common storage for the jobs, and as the method of communication between the GSM and LSMs. The Coupling Facility is mostly used to store active jobs ( jobs that passed the Select phase – and are Eligible for Run - but have not ended yet).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| GSM                                     | See Control-M Global Sysplex Manager.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Global                                  | See Control-M Global Sysplex Manager.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| LSM                                     | See Control-M Local Sysplex Manager.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Local                                   | See Control-M Local Sysplex Manager.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| RAS                                     | CTMPLEX is designed to achieve continuous operation (24x7), enable the maintenance of the Sysplex without stopping Control-M, and minimize the delay caused in cases where a monitor or CPU failure occurs. When the GSM unexpectedly terminates (either abended or its CPU terminates), one LSM (the first to detect GSM failure) switches itself to function as the GSM. When an LSM fails, the GSM takes responsibility over the work that was handled by the failing LSM, and passes it to another available LSM. When the Coupling Facility fails (or is not used), the GSM itself can continue working without the Coupling Facility and without the LSMs (as a regular Control-M, not in CTMPLEX mode).                                                                                                                    |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Workload Balancing | <p>CTMPLEX is designed to work with or without Workload Balancing between Control-M monitors. In a Workload Balancing mode, the GSM assigns work to LSMs according to a predefined capacity and the current utilization of each LSM (and the GSM itself), trying to make the utilization percentage equal on all Control-M monitors. In non-Workload Balancing mode, each LSM "picks up" jobs for processing according to its availability. Initialization parameters and real-time Modify commands may enable or disable Workload Balancing mode and change the capacity for the Control-M monitors on each Sysplex member.</p> <p>For each Sysplex member, a relative capacity (parameter RELCAP) and a maximum capacity (parameter MAXCAP) can be specified. RELCAP is used for calculating the utilization of members (for workload balancing). MAXCAP specifies the maximum number of jobs that can be processed by a Control-M monitor (GSM or LSM) running on the corresponding member.</p> <p>Example: The administrator can give low priority to batch processing during the day shift by utilizing CPUA with no more than 50 jobs and CPUB with no more than 60 jobs. During the night shift, the administrator can give batch processing a higher priority by changing the number of jobs in both CPUs to 150 concurrent jobs.</p> |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## CTMPLEX Configuration Considerations

Although no special configuration requirements are necessary, the following points must be taken into consideration:

- All MVS systems (on which Control-M's GSM and LSMs monitors can run) must be members of one Parallel Sysplex with a Shared Spool (either JES2 MAS complex or JES complex). The Coupling Facility structure used by CTMPLEX must be available to all such Sysplex members.
- The corresponding JES subsystems must share the same spool and checkpoint datasets. This means that the spool must be a JES2 multiaccess spool (MAS) configuration or a JES3 complex.
- The size of the Coupling Facility's List Structure is calculated based on numbers supplied during installation. These numbers must be carefully evaluated to make the List Structure large enough to contain all active jobs at any time, but not to make it too large so that it adversely affects the operation of the Coupling Facility itself.
- A global resource serialization product (GRS, MIM or an equivalent product) must be used in the complex. In a Parallel Sysplex environment, every Sysplex member must be in the same Global Resource Serialization complex, since CTMPLEX needs a Global Serialization of resources in the complex.

## CTMPLEX Installation Considerations

CTMPLEX is activated by setting parameter CTMPLEX to Y in the member CTMPARM.

The member CTMPLEX specifies Control-M Sysplex installation parameters. This parameter member contains global parameters for both the CTMPLEX and specific initialization parameters for every Sysplex member where the GSM or LSMs can run. For more information about this member, see the *INCONTROL for z/OS Installation Guide: Installing*.

The procedure used to start GSM and all LSMs must be the same under all Sysplex members, and DD statements DAPARM and STEPLIB must point to the exact same libraries.

## Controlling CTMPLEX

GSM manages dialogs with the operator, and ensures synchronization between all monitors in CTMPLEX. Operator-modified commands must be issued to GSM only. GSM then passes relevant commands to all LSMs, saves the current working profile, and provides the profile to new LSMs.

**Table 122 Operator Commands**

| Operator Command | Description                                                                                                                                                                     |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S CONTROLM       | Initially start the CONTROLM monitor on any system. The monitor becomes either a GSM or LSM monitor depending on whether there are other CONTROLM monitors of the same CTMPLEX. |
| F CONTROLM       | Issue a command to Control-M CTMPLEX. May be issued on the system where GSM runs.                                                                                               |
| P CONTROLM       | Stop any LSM (when issued on the system where an LSM runs) or stop the entire CTMPLEX (when issued on the system where the GSM runs).                                           |
| P LOCAL          | Stop an LSM started by the S CONTROLM.LOCAL operator command.                                                                                                                   |

**Table 123 Operator Command Options**

| Option    | Description                                                                                                                                                                                                                                                                                                                                       |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BALANCE   | <p>Activates or inactivates a Work Balancing mode, overriding the value of parameter BALANCEM (specified in the CTMPLEX initialization member). Valid values are:</p> <p>YES – Activate Work Balancing mode.</p> <p>NO – Deactivate Work Balancing mode.</p>                                                                                      |
| STOPPLEX  | <p>Stops all LSM monitors. The GSM monitor continues working in regular (not CTMPLEX) mode.</p> <p>Note: The stop operator command (P CONTROLM) issued for a GSM monitor stops all CONTROLM monitors of the corresponding environment. The stop command issued for an LSM stops that LSM only.</p>                                                |
| STOPGSM   | <p>Stops the GSM monitor. Valid values are:</p> <p><i>system_identifier</i> – If a system identifier is specified, the LSM monitor of the corresponding system (Sysplex member) becomes the new GSM.</p> <p>' ' (Blank) – If a system identifier is not specified, the first LSM that detects that the GSM has shut down becomes the new GSM.</p> |
| LISTPLEX  | Displays information about all monitors (GSM and LSMs) of the CTMPLEX.                                                                                                                                                                                                                                                                            |
| STARTPLEX | Resumes CTMPLEX processing after environmental errors related to the CTMPLEX Coupling facility structure occur. After such errors, CTMPLEX stops all LSMs and the GLM continues working in standalone mode until the STARTPLEX command is issued.                                                                                                 |
| WHOGLOBAL | Displays information about the GSM. This is the only CTMPLEX command valid for local monitors (LSMs).                                                                                                                                                                                                                                             |
| DUMPPLEX  | Issues a diagnostic dump (to any of SYS1.DUMPxx datasets) in order to obtain the contents of the CTMPLEX Coupling facility structure.                                                                                                                                                                                                             |
| NEWPLEX   | Enables dynamic refreshing of CTMPLEX parameters                                                                                                                                                                                                                                                                                                  |



## Automatic recovery of the CTMPLEX Facility after Coupling Facility failures

If automatic recovery of CTMPLEX is inactive, then in the case of Coupling Facility failures or other problems that prevent Control-M from working in CTMPLEX mode, the following occurs:

- All Local monitors stop (either by themselves or according to a request from a Global monitor).
- The Global monitor releases all CTMPLEX resources, disconnects from the Coupling Facility, and continues working as a regular CTM monitor. This is actually the same processing as one happens after STOPPLEX operator command.

To resume CTMPLEX processing (to return to CTMPLEX mode), the operator should issue the STARTPLEX operator command. As the result of this command, the Control-M monitor loads CTMPLEX resources and definitions, connects to the Coupling Facility, and becomes a Control-M Global monitor. After this, the operator may start Local monitors.

The CTMPLEX Automatic Recovery function automatically performs the actions mentioned above (reactivating CTMPLEX and restarting Local monitors), without any need for operator intervention. Automatic Recovery is controlled by the RECOVER and RECOVERM CTMPLEX installation parameters.

When Automatic Recovery is activated (the RECOVER installation parameter is not set to zero), in the case of Coupling Facility errors (or other failures preventing Control-M from using CTMPLEX), the Global monitor releases all CTMPLEX resources and continues working as a regular (standalone) Control-M monitor. Local monitors pause and wait for CTMPLEX to be reactivated.

From time to time, in accordance with the value of the RECOVER installation parameter that defines the interval between attempts, the Global monitor tries to recover CTMPLEX. This means that the Global monitor tries to build a CTMPLEX environment, connect to Coupling Facility, allocate and populate new Coupling Facility structures, and so on. New Coupling Facility structures may be allocated in another Coupling Facility and have characteristics such as when the Global monitor uses the current CTMPLEX parameters member and active CFRM policies. The Global monitor may try several attempts to recover CTMPLEX. The maximum number of attempts is set by the RECOVERM installation parameter in the CTMPLEX parameters member.

If the Global monitor succeeds in recovering CTMPLEX, then the Global monitor frees Local monitors by sending them an order to resume operation). If the Global monitor does not successfully resume CTMPLEX within the maximum number of attempts allowed the RECOVERM installation parameter in the CTMPLEX parameters member), then it orders Local monitors to shut down.

## Troubleshooting and Disaster Recovery Planning

### Control-M Errors

If a critical internal error is detected in the Control-M monitor, the monitor automatically shuts itself down and the following highlighted unrollable message is issued to the operator console:

---

**CTM121S Control - M MONITOR ENDED WITH ERROR**

---

If there is an abend in one of the Control-M monitor's tasks, the monitor abends with user abend code U0006. If this occurs, contact the INCONTROL administrator. Always have a full dump of the original abend (not the U0006) available for analysis.

## Problem Determination using the Internal Trace Facility

IOA provides an internal Trace facility that can print internal trace records and the contents of internal data areas. Under normal circumstances, the Trace facility is dormant. However, if required (that is, BMC Customer Support has requested trace information), the Trace facility can be activated.

➤ To use the Control-M internal Trace facility, issue the following operator command:

```
F CONTROLM, TRACE=level
```

where *level* indicates trace levels to be activated or deactivated. The Control-M Trace facility has 128 levels (that is, from 1 through 128). Any number of these levels can be on at a given time. Valid values are

- x – Trace level to turn on  
Example: TRACE=3 turns on trace level 3.
- -x – Trace level to turn off  
Example: TRACE=-3 turns off trace level 3.
- (x:y) – Range of trace levels to turn on, where x is the first level in the range and y is the last level in the range.  
Example: TRACE=(1:10) turns on trace levels 1 through 10.
- (-x:-y) – Range of trace levels to turn off, where x is the first level in the range and y is the last level in the range.  
Example: TRACE=(-1:-10) turns off trace levels 1 through 10.
- (x,y,z,...) – Multiple trace levels to turn on.  
Example: TRACE=(3,5,29) turns on trace levels 3, 5 and 29.
- (-x,-y,-z,...) – Multiple trace levels to turn off.  
Example: TRACE=(-3,-5,-29) turns off trace levels 3, 5 and 29.
- SHOW – Shows the current status of all trace levels.

Depending on which trace levels were turned on, trace information is written to one or more of the following locations:

- DD statement DATRACE of the Control-M procedure
- DD statement DADUMP of the Control-M procedure.
- SYSDATA of the Control-M started task

When you finish performing the problem determination procedures, use the following operator command to turn off all trace levels:

```
F CONTROLM, TRACE=(- 1: - 128)
```

Control-M performance trace data can also be accumulated and processed in conjunction with the IOA Internal Trace facility. For more information, see Chapter 2, "IOA Administration."

## Capturing first failure data using In-Memory Buffer Trace

For Control-M the IOA Internal Tracing facility supports an additional option for tracing into memory buffers. Tracing into memory buffers makes the most relevant data available the moment a problem first arises. The trace data is written into a buffer that wraps around to the beginning when the end of the buffer is reached. The content of the buffer is available in dumps or by manually flushing it to an output file when required. For more information on the Internal Tracing facility, see Chapter 2, "IOA Administration."

The Control-M RELOAD and FLUSH modify commands for the In-Memory Buffer Trace feature are available to the Control-M Monitor and Application Server.

Use the following command to refresh the trace facility parameters from the DATRCIN and DATRCBF files:

---

**F <moni tor>, TRACE=RELOAD**

---

Use the following command to write the contents of a memory buffer to the DD statement DATRACE file:

---

**F <moni tor>, TRACE=FLUSH, BUFI D=ALL**

---

Use the FLUSH command whenever the operator determines irregular behavior of the product.

## Determining the Control-M Trace Level Intensity Preference

The user has the option to choose the intensity level of the traces produced by the Control-M Trace Facility. For the Control-M monitor and Newday process the intensity level is determined by choosing one of the following members located in the CTM PARM library:

- CTMTRCML contains the Low trace intensity levels with an allocated buffer size of 300,000 lines
- CTMTRCMM contains the Medium trace intensity levels with an allocated buffer size of 900,000 lines
- CTMTRCMH contains the High trace intensity levels with an allocated buffer size of 1,500,000 lines

Each of the members listed above contain the same trace level. They differ only in the size of the buffer allocated.

For the Control-M Application Server the intensity level is determined by choosing one of the following members located in the CTM PARM library:

- CTMTRCAL contains the Low trace intensity levels
- CTMTRCAM contains the Medium trace intensity levels
- CTMTRCAH contains the High trace intensity levels

Control-M uses the MTRC parameter in the Control-M monitor, Newday process and Application Server JCL procedures to determine which trace intensity level member to use. The user can specify the trace intensity level by setting the MTRC parameter to one of the following values:

- L - Low trace intensity level
- M - Medium trace intensity level (Default)
- H - High trace intensity level

## Control-M Health Checker interface

The Control-M Health Checker interface is an additional tool that you can use in troubleshooting problems in Control-M. For an overview of the Control-M Health Checker interface, see the *Control-M for z/OS User Guide*. For details on implementing this interface, see the *INCONTROL for z/OS Installation Guide: Customizing*.

## Performance data collection

The Control-M monitor accumulates performance data which is used to produce SMF records. These records are written out to SMF at given time intervals (controlled by the PFMINT parameter in the CTMPARM member of the IOA PARM library), or in response to the operator command PERFDATA. The writing of the SMF records is accompanied by corresponding messages in the Trace file.

## Understanding the performance data record

The monitor writes performance records for each relevant function. Functions may be job specific (such as the reading of one particular job's output), or can relate to an entire cycle (such as one cycle of CTMSEL).

The following table describes the structure of the performance record written to SMF. The structure of the IOA log messages, issued along with the SMF records, is similar but has meaningful text values substituted for task-name and function-name.

**Table 124      Structure of performance record**

| Field                                                                                                                                                                           | Comments                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| task-name                                                                                                                                                                       | Identifies the application for which performance data is being accumulated. See the following table for a list of possible task names and their associated functions:            |
| start-date-accumulation                                                                                                                                                         |                                                                                                                                                                                  |
| start-time-accumulation                                                                                                                                                         |                                                                                                                                                                                  |
| Note: The following fields provide function level details and are repeated (as a unit) as many times as needed, depending on the number of functions being traced for the task. |                                                                                                                                                                                  |
| function-name                                                                                                                                                                   | Identifies the process within the task for which the performance data was accumulated. See the following table for a list of possible task names and their associated functions. |
| number-of-times-called                                                                                                                                                          |                                                                                                                                                                                  |
| total-elapse-time                                                                                                                                                               |                                                                                                                                                                                  |
| total-cpu-time                                                                                                                                                                  |                                                                                                                                                                                  |
| average-elapse-time                                                                                                                                                             |                                                                                                                                                                                  |
| average-cpu-time                                                                                                                                                                |                                                                                                                                                                                  |
| maximum-elapse-time                                                                                                                                                             |                                                                                                                                                                                  |
| maximum-cpu-time                                                                                                                                                                |                                                                                                                                                                                  |
| func-related-#                                                                                                                                                                  |                                                                                                                                                                                  |
| func-related-avg#                                                                                                                                                               |                                                                                                                                                                                  |

The following example shows a performance record:

```
<task-name, start-date-accumulation, start-time-accumulation, [function-name,
number-of-times- called, total-elapse-time, total-cpu-time, average-elapse-time,
average-cpu-time, maximum-elapse-time, maximum-cpu-time, func-related-#,
func-related-avg#] [...]>
```

The following table shows a list of possible task names and their associated functions:

**Table 125      Performance data accumulation tasks and associated functions**

| Task   | Description          | Functions                                                   |
|--------|----------------------|-------------------------------------------------------------|
| CTMRUN | Control-M monitor    | RUN<br>CKP<br>PLX<br>OPR                                    |
| CTMSEL | Selection processing | SEL<br>WCN<br>X15<br>CND<br>SHT<br>CNU<br>PRE<br>POS        |
| CTMSUB | Submitter processing | SUB<br>MEM<br>JSP<br>X02<br>SE2<br>JES<br>ERQ<br>STC<br>ALC |
| CTMSPY | Output processing    | SPY<br>STA<br>PSO<br>SDB<br>COP<br>EX2                      |

| Task             | Description                                | Functions                                                                               |
|------------------|--------------------------------------------|-----------------------------------------------------------------------------------------|
| CTWSRVR, CTWSRUS | Control-M application server               | SRV<br>XDS<br>DWN<br>SNC<br>USR<br>INF<br>UPL<br>DFD<br>DFU<br>ORD                      |
| CTWDET           | Control-M application server (detector)    | DET<br>AJU<br>AJN<br>CND<br>RES<br>ALR<br>AJO                                           |
| CTMFRM, CTMJOB   | AJF formatting and Job Ordering processing | REA<br>PHS<br>PAR<br>GRP<br>FRS<br>RSO<br>WRI<br>JOB<br>RET<br>SEC<br>TAP<br>IGN<br>INP |

| Task   | Description             | Functions                       |
|--------|-------------------------|---------------------------------|
| CTMJOB | Job Ordering processing | JOB<br>RET<br>SEC<br>TAP<br>IGN |

Note: BMC may modify the list of tasks and associated function names as the needs arise.

## Collecting performance data

The profiler is called at the start (before) and end (after) of a function. The following information is passed to the profiler each time it is called.

- task identifier (task-name)
- function identifier (function-name)
- processing unit identifier (processing-unit-id)
- before/after indicator

When the profiler is called at the end (after) of the function the program performs the following actions:

calculates the statistical data

adds the data to the accumulated statistic record

edits the data based on the trace level specified

writes a readable performance record (or keeps it in memory).

For all record types, the data will be included in the performance record if the time is equal or greater than 0.01 sec.

## Writing performance records

Performance records are accumulated at given time intervals controlled by the PFMINT parameter. (For more information, see the *INCONTROL for z/OS Installation Guide: Customizing*). At each interval the following process occurs:

- the accumulated records are written to SMF
- the records used to accumulate the data are cleared
- accumulation process starts again with the cleared records

You can use the PERFDATA Control-M modify command, at any time, to write the accumulated data to SMF records. The PERFDATA command triggers the same process as above. Messages generated by the PERFDATA command are directed to the console issuing the command. For more information, see [Accumulating performance data](#) (on page 212).



By setting a trace level it is also possible to specify that performance records be written to the system log as they are being accumulated. For each component of the Control-M monitor there are specific trace levels and error messages which cause the performance records written by that component to be written immediately.

## Customizing the collection of measurements for Control-M Configuration Manager

For instructions of how to generate a usage measurement report for Control-M for z/OS, see Control-M diagnostics > Generating diagnostic data in the *Control-M Administrator Guide*.

Beginning with z/OS® V1R12|(and z/OS V1R11 and z/OS V1R10 with the PTFs for APAR|OA29894 applied), the system administrator must register the CTWRSMF program (supplied by BMC, in the LOAD library, for use as a user exit for IFASMFDP) on the system according the IBM instructions described at the following location:

<http://publib.boulder.ibm.com/infocenter/zos/v1r12/index.jsp?topic=%2Fcom.ibm.zos.r12.e0zm100%2Fifasmf1.htm>

A job skeleton is provided in the CTMJSMF member of the CTM JCL library.

The usage measurements are stored in a file, allocated by the DACSV DD statement. The user can change any of the parameters in this DD statement, including the dataset name (DSN). To make sure that the names for new datasets are unique, use the special %%DATE and %%TIME parameters (reserved for DACSV dataset names), where %%DATE specifies the current date and %%TIME specifies the current time.

For example, the original dataset name is as follows:

```
%OLPREFM%.CSV.D%%Date.T%%Time
```

where %%OLPREFM%% is the prefix library.

There is no need to define input datasets for the job, since by default all active system SMF datasets are being used as input. To increase the time period for data retrieval, any number of archived SMF datasets can be added to the job skeleton. The user can include additional archived SMF files by adding a separate DD statement for each SMF file as follows:

```
//ddname_1 DD DISP=SHR, DSN=dataset_name_1
```

```
//ddname_2 DD DISP=SHR, DSN=dataset_name_2
```

To process these additional archived datasets, the corresponding input (SYSIN) statements must be added to the job skeleton as follows:

```
INDD(DDNAME_1, OPTIONS(DUMP))
```

```
INDD(DDNAME_2, OPTIONS(DUMP))
```

## Disaster Recovery Overview

This topic describes disaster recovery tasks that must be performed in advance. If necessary, one can plan to activate the Control-M monitor on a different computer system in the same data center (multi-CPU sites) or at a backup site.

Prepare the disaster recovery plan (a set of documented steps and procedures to implement in a specific order when the need arises) in advance. The documentation and software that form the disaster recovery plan must always be available so that the plan can be implemented quickly and easily. All of the topics discussed below must be considered.

## Recovery Tools

The following tools, if properly implemented in advance, can be used for disaster recovery.

### Dual Checkpoint Mode

The Control-M monitor can work in dual checkpoint mode. Under this mode, the Control-M monitor maintains duplicate copies (mirror files) of the Control-M Active Jobs file (CKP) and the IOA Conditions file (CND). If a disk crash makes the primary files inaccessible, they can be restored from the mirror files.

For reasons of physical safety, both the mirror CKP and the CND must be placed on a different disk than the other Control-M files.

No dual checkpoint mode is available for the Control-M Resources file (RES).

Because of performance considerations, BMC no longer recommends using the mirror file mechanism. Instead—for backup and recovery—use the Control-M Journaling facility, described in [Journaling](#) (on page 355). By using Journaling, you can avoid the performance loss associated with mirroring, taking advantage of the increased efficiency and integrity features built into modern storage devices.

The installation procedure for dual checkpoint mode is described in the explanation of ICE Step 4.2, "IOA Operational Parameters," and ICE Step 7, "Set Global Variables Database," in the IOA chapter of the *INCONTROL for z/OS Installation Guide: Installing*, and in the explanation of ICE Step 2, "Specify Control-M Parameters," and ICE Step 3.1, "Control-M Libraries and Repository," in the Control-M chapter of the same guide.

When working in dual checkpointing mode, the Control-M monitor keeps the Active Jobs mirror file synchronized with the primary Active Jobs file. The mirror file must be protected from any update by another source. If either the primary or mirror file becomes damaged, the Control-M monitor shuts down with an appropriate message. To resume Control-M monitor operation, the damaged file must be restored.

The Autoswitch feature can be enabled. If Dual Checkpointing is active, and the primary Active Jobs file undergoes hardware and software problems (in other words, is damaged), Control-M automatically switches to dual. A message is issued, indicating that

- you are working now in dual (this message is unrollable)
- processing continues in both files

## Restoring the Active Jobs file

To restore the Active Jobs file, perform the following steps:

Allocate and format a new Active Jobs file using utility FORMCKP.

Run utility CTMCAJF. Use the undamaged (dual) Active Jobs file as input and the newly created Active Jobs file as output.

Rename the damaged file. Then rename the newly created Active Jobs file with the original name of the damaged primary or mirror file.

Restart the Control-M monitor.

## Restoring the IOA Conditions file

To restore the IOA Conditions file, perform the following steps:

Allocate and format a new IOA Conditions file using utility FORMCND. For information about the structure and space requirements of the IOA Conditions file, see the section that discusses the structure of the IOA Conditions File in the *INCONTROL for z/OS Installation Guide: Installing*.

Run member IOACCND in the IOA JCL library. Use the undamaged Conditions files as input and the newly created Conditions files as output.

Rename the damaged file. Then rename the newly-created file (CND) with the original name of the damaged primary or mirror file.

Restart the Control-M monitor.

## Journaling

Journaling is an optional feature that can be implemented by the INCONTROL administrator. If implemented, the Control-M Journal file collects data about changes occurring in the Control-M Active Jobs file, the IOA Conditions file and the Control-M Resources file during the Control-M working day. If the Control-M Active Jobs file, the IOA Conditions file (optionally) and the Control-M Resources file (optionally) need to be restored (for example, following a system crash), utility CTMRSTR can be run to restore the files (from the data in the Journal file) to the status they were in as of any specific time after the last run of the New Day procedure.

If Control-M installation parameter JRNL is set to Y (Yes), changes made to the Active Jobs file and prerequisite conditions added or deleted in the IOA Conditions file are recorded in the Journal file. If the Active Jobs file and/or IOA Conditions file must be restored, the Journal file can be used to implement the restoration.

## Journal File Initialization

Journal file initialization is performed by the Control-M monitor as part of New Day processing after the Newday procedure has completed OK. Initialization consists of the following steps:

- Journal file initialization - All previous data in the Journal file is deleted. The file is initialized with date information that establishes synchronization with the Active Jobs file.
- Active Jobs file snapshot - A snapshot of the Active Jobs file is taken. If the Active Jobs file must be restored, this snapshot file serves as the base file upon which restoration is performed.
- IOA Conditions file snapshot - A snapshot of the prerequisite conditions in the IOA Conditions file is taken. If the IOA Conditions file must be restored, this snapshot file serves as the base file upon which restoration is performed.

## Journal File Commands

Journal file activity is controlled by issuing modify commands to the Control-M monitor. The following modify commands are available:

### **F CONTROLM, JOURNAL=ENABLE**

This command initializes journaling. The steps described [Journal File Initialization](#) (on page 355) are performed, after which any changes made to the Active Jobs file and to prerequisite conditions in the IOA Conditions file are recorded in the Journal file.

### **F CONTROLM, JOURNAL=DI SABLE**

This command stops journaling. The Control-M monitor continues normal processing without recording any changes in the Journal file.

## Restoration

Utility CTMRSTR is used to restore the Active Jobs file and, optionally, prerequisite conditions in the IOA Conditions file. This utility is documented in the *INCONTROL for z/OS Utilities Guide*. When running this utility, consider the following:

- The Control-M monitor and the Control-M Application Server (CTMAS) must be shut down when running utility CTMRSTR. If parameter CONDITIONS NO is specified in the utility job stream, Control-D and Control-O is not affected. If parameter CONDITIONS YES is specified, the operation of Control-D and Control-O can be affected by changes to prerequisite conditions in the IOA Conditions file.
- Control-M and the Control-M Application Server (CTMAS) must be activated after restoration. Other INCONTROL products need not be recycled.
- The ALTCKP file is fully updated when the Control-M monitor is initialized. Therefore, no special handling is needed for the restored Active Jobs file.
- If parameter ENDTIME specifies a date or time that is earlier than the timestamp on the last entry of the Journal file, not all entries in the Journal file are restored. When the monitor is activated with the restored Active Jobs file, the following message are issued with a reply request:

```
CTML14E JOURNAL FILE IS NOT SYNCHRONIZED WITH NEWDAY PROCESSING
```

The following replies are possible:

- C – Continue without journaling. The Control-M monitor continues normal execution without updating the Journal file. This option can be used to ensure that Control-M is running properly after restoration. If necessary, Control-M can be shut down to perform restoration again. If no problems are encountered after restoration, the command JOURNAL=ENABLE can be used to reactivate journaling.
- I – Initialize the Journal file. journaling is activated immediately after initialization and synchronization with the Active Jobs file. All data used to restore the Active Jobs file is deleted.
- E – Shut down the Control-M monitor. The Journal file is not initialized.

## The Control-M Recovery Facility

Whenever the Control-M monitor terminates, regardless whether the termination is normal or abnormal, Control-M performs a synchronization of the job data in memory with the disk copy kept in the CKP file. However, in rare cases where Control-M is unable to perform the synchronization, some of the jobs might remain in the CKP file in an ambiguous status. When Control-M is restarted, these jobs must be analyzed to clarify their actual status. In a CTMPLEX environment, a similar result might occur whenever a monitor (whether Global or Local) terminates abnormally or when there is a Coupling Facility failure (where the Local monitor activities cannot be passed to the Global monitor and saved in the Active Jobs File).

When Control-M detects an abnormal Control-M monitor termination, which prevents job information synchronization, or a similar situation in a CTMPLEX environment, Control-M automatically goes into "Recovery Mode." In this mode, Control-M extracts information about the jobs from the IOA LOG to determine the exact status of the jobs.

If the job status can be determined from the IOA LOG, the Control-M Recovery Mode processing sets the appropriate status. When Control-M restarts, the job processing continues without any need for manual intervention.

If the job status cannot be determined from the IOA LOG, to avoid the possibility of a duplicate submission or a DO FORCEJOB execution, the Control-M Recovery Mode processing puts the job into HOLD status and issues an appropriate message (see messages CTM5B3W and CTM5B4W in the *INCONTROL for z/OS Messages Manual*). These actions give the customer the opportunity to clarify the status of each of the jobs and perform the appropriate actions manually.

The installation parameters that control the Control-M Recovery Mode processing are located in the RECOVERY section of the CTMPARM parameters member. For more information about the parameters, see the RECOVERY section in Chapter 2, Customizing Control-M, in the *INCONTROL for z/OS Installation Guide: Customizing*.

## Planning and Creating a Disaster Recovery Plan

### Safeguarding MVS, JES, Exits and Other Definitions

Any defined links (such as exits) between MVS, JES (or any other software product or application), and Control-M, must be documented, backed up, and defined in the disaster recovery plan.

## Example

Adding the Control-M LOAD library to the LLA facility.

- authorizing the LOAD library
- changes to MVS exits
- changes to JES parameters and exits
- TSO Logon procedures and authorizations

## Security Considerations

All security parameters must be backed up in such a way that they can be installed in the backup computer as a whole, not as a special "patch" installation.

Pay special attention to the following points:

- The correct implementation of the security authorizations needed by the Control-M monitor (that is, defining the Control-M monitor and its special authorization to the security package used in the backup computer).
- All security parameters and definitions must be backed up and copied to the backup computer.
- Third-party vendor exits relating to Control-M (for example, RACF exit for R1.7 and R1.8—see the *RACF Security Guide*) must be copied, installed and checked in the backup computer, thus enabling a quick and correct implementation if the need arises.
- Control-M security exits, if used, must be checked and passed as a part of the disaster recovery plan.

## Scheduling Libraries and Other Production Libraries

Back up the following datasets at regular intervals, so that they are available if needed:

- Control-M scheduling libraries
- production JCL libraries
- production parameters libraries
- production symbols libraries

These libraries, used by Control-M, must be backed up together. Perform this backup just after the New Day procedure has ended OK.

This backup is important because it reflects a picture of the production environment just before production begins. If a production application must be run again (for example, because a programming error entered corrupt data in the database) the backup can be used to reconstruct the environment.

An alternative solution is to utilize the History Jobs file. During New Day processing, jobs that ended OK or expired (according to job scheduling definition parameters) are deleted from the Active Jobs file. If these jobs are placed in the History Jobs file during New Day processing, they can be easily restored (by request) to the Active Jobs file for subsequent restart.

## Backup Procedures

Control-M files and appropriate production libraries must be backed up periodically. It is recommended that this backup be made just before batch processing begins. The backup frequency depends on your site's requirements.

The New Day procedure creates a backup of the Active Jobs file before it begins deleting "yesterday's" jobs. The backup (DSN suffix "BKP") must reside on a different disk than the Active Jobs file. This standard backup enables the internal recovery of the New Day procedure in case of cancellation, abends, system crash, or similar events.

The Active Jobs file, the Control-M Resources file (RES), and the IOA Conditions file (CND), do not require special utilities for backup and can therefore be included in the standard site disk backup and maintenance procedures.

## Control-M Parameter Definitions

The Control-M installation procedure, parameters, and exits must be tailored to the backup computer. The Control-M production control system must be installed and checked.

### Examples

- Control-M installation parameters (for example, HLDCLAS, INTERVLM, QNAME, SHRQNAM, ARCUNIT) may change, depending on the backup computer. For details, see the installation steps in the Control-M chapter of the *INCONTROL for z/OS Installation Guide: Installing*.
- The mode of operation may differ (Dual Checkpoint mode or regular mode). For details, see the installation steps in the IOA chapter of the *INCONTROL for z/OS Installation Guide: Installing*.
- Installation parameter CPUS must be adjusted to the backup computer. For details, see the installation steps in the IOA chapter and Control-M chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

Take a close look at the installation procedure. Appropriate adjustments must be documented in the disaster recovery plan.

## Catalog Considerations

Use a shared catalog when working in a multi-CPU environment. In case of a computer crash, all the relevant files remain cataloged in the backup computer. If any files are not cataloged in the shared catalog, they must be cataloged in advance in the backup computer.

## Defining an Authorized TSO User

Define a special TSO user as part of the disaster recovery plan. Give this user the same security authorizations as the Control-M monitor.

## Examples

- Ability to access all production JCLs, parameters and AutoEdit Facility symbol libraries (in read mode).
- Ability to issue the TSO submit command from this special TSO user.
- Authorization to submit jobs on behalf of other users. This authorization must enable the special TSO user to submit jobs as if they were submitted by Control-M.

## Problem Resolutions

Various types of problems can occur in the Control-M environment. Examples include

- system crash (software and hardware)
- Control-M abends
- disaster recovery relocation
- system maintenance (for example, installing a new version of z/OS)

Recommended solutions are presented for each of these problems.

## Control-M Structural Recoverability

The Control-M production control system must never be down. The Control-M monitor, Online facility, ISPF utilities, Key-Stroke Language (KSL) and batch utilities are separate components. Most of them continue working even if other components are inoperable.

## System Crash Auto Recovery Options

The Control-M LOAD library, Core, and Repository (that is, Active Jobs file CKP, Conditions file CND, Control-M Resources file RES, History Jobs file, and IOA Log file) must be restored to activate the Control-M monitor in the backup site or the original site.

Once the monitor is active, it checks the JES queues and the Active Jobs file. The status of active jobs that are not on the JES queues change to "JOB DISAPPEARED". Other jobs are tracked, scanned or submitted when they are eligible.

Automatic handling of a system crash is illustrated in [Automatic Recovery after a System Crash](#) (on page 365).

## System Crash

The Control-M monitor is usually started automatically as part of the IPL procedure. If any Control-M files are inaccessible, the monitor shuts down with an appropriate message.

Because the Control-M monitor is usually already active, it resumes production processing automatically.



## Control-M Files are inaccessible

Disaster recovery from file inaccessibility (for example, file deleted by mistake, disk crash, and so on) is generally an easy task. Journaling, as well as appropriate backup and recovery procedures, provide a good solution to this recovery problem. For more information, see [Recovery Tools](#) (on page 354).

## IOA Log file is inaccessible

Define a new IOA Log file using utility CTMFRLOG. Then activate the Control-M monitor.

## Active Jobs file or IOA Conditions file is inaccessible – Non-dual mode

The status of the production environment can be determined according to the IOA Log file or the Active Jobs file (depending on which file is inaccessible). The recovery process is done manually, using reports extracted by specially designed programs and KSL.

In either case, whether running in dual mode or not, it is advisable to use the journaling and Restoration facility.

The Journal file is used to collect data relating to changes occurring in the Control-M Active Jobs file and the IOA Conditions file during the Control-M working day.

The Journal file is initialized each day during New Day processing. From that point on, for the rest of the working day, the Control-M monitor records in the Journal file all activities that impact the Active Jobs file and all prerequisite condition changes.

If the Active Jobs file and (optionally) the IOA Conditions file need to be restored, run utility CTMRSTR to restore the files to the status they had as of any specific time after the last run of the New Day procedure.

## AutoEdit Simulation Facility

In general, do not stop production processing even if the Control-M monitor cannot be activated (for example, if the Control-M Active Jobs file was deleted or a programming error occurred in one of the Control-M exits).

The SUBMIT option of the AutoEdit Simulation facility can be used to enable submission of production jobs using the authorized TSO user. For additional information see [Defining an Authorized TSO User](#) (on page 359).

You can determine what must be executed or submitted, and in what order, by using specially designed programs and KSLs. For more information on this topic, see [Manual Recovery Procedures](#) (on page 363).

The AutoEdit Simulation facility simulates a Control-M monitor submission (that is, it activates the Control-M submission exit (Exit 2) and the AutoEdit facility). As a result no modifications to the JCL libraries are needed when submission is done through this facility.

The submission exit (Exit 2) can be used to check security authorizations. If security considerations for the recovery process are different, use an alternate submission exit.

JCL members that have AutoEdit facility statements before the JOB statement may cause the submission of a dummy job.

## Control-M Monitor Abends

If the Control-M monitor abends, it may be possible to determine that a specific job or started task caused the abend, as follows:

- Examine any error messages that are displayed on the MVS Syslog screen.
- Scan the bottom of the Control-M log for the last jobs handled by Control-M. The last jobs handled probably caused the abend.

If this is the case, change the status of the specific job or started task to HELD using the Control-M Active Environment screen. When the monitor is reactivated, it processes the held request first and thus enables continuation of production work. (Control-M bypasses all jobs in HELD status.)

To automate this process of Control-M monitor abend recovery for future occurrences, set the MAXJBHLD parameter in member CTMPARM of the IOA PARM library. For more information, see the *INCONTROL for z/OS Installation Guide: Customizing*, "Customizing INCONTROL products" > "Control-M customization considerations."

If the Control-M monitor cannot be reactivated, continue to work manually, as explained in [Manual Recovery Procedures](#) (on page 363).

For more information about implementing the submission work plan, see [Manual Recovery Procedures](#) (on page 363).

## Disaster Relocation

### Shared DASD (Multi-CPU Environment)

Starting a Control-M monitor in the second CPU should not be a problem, because all production files (that is, the Control-M LOAD library, the Repository, the production JCL parameters, and the symbols libraries) are cataloged and reside on shared DASD. For more information, see [Control-M Parameter Definitions](#) (on page 359).

### Backup Site

Use the disaster recovery plan. Transfer Control-M and the production files from the most recent backups. Install and activate Control-M. Resume production work using manual recovery procedures and these backups. For more information, see [Manual Recovery Procedures](#) (on page 363).

## System Maintenance

System maintenance usually does not affect Control-M. After system maintenance ends, activate the Control-M monitor and resume production. However, when making a major change or upgrade to MVS or JES, it is recommended that you test the production environment before performing the upgrade.

If the MVS SPOOL is to be changed or reformatted during system maintenance, perform the following steps:

1. Shut down the Control-M monitor.
2. Unload the content of the SPOOL to tape or disk

Before production resumes, perform the following steps:

3. Reload the SPOOL.
4. Reactivate the Control-M monitor.

If the SMF-ID or the JES-ID are changed, see the *INCONTROL for z/OS Installation Guide: Installing* > "Installation considerations" > "Adding, deleting and/or changing an SMFID in the computer list."

## Manual Recovery Procedures

Manual recovery can be performed by using the IOA Log file or the Control-M Active Jobs file (depending on the file that is accessible).

The relevant KSL scripts in the IOA SAMPLE library can be tailored as necessary.

### CTMRFLW and CTMRNSC Reports

If the Control-M monitor cannot be activated or the Active Jobs file is inaccessible, use the CTMRFLW and CTMRNSC reports to determine which jobs to submit, and in what order.

Job flow report CTMRFLW provides information about jobs in the Active Jobs file sorted by SMART Tables. For each SMART Table, the jobs are presented in order of expected execution. Generate this report daily, before starting the batch production cycle. It can be used if the Active Jobs file is lost during the batch production cycle.

The night schedule report (CTMRNSC) provides a summary of all jobs that executed during a specified time range. The start-time, end-time, elapsed time, and other data are reported for each job. Sort the report by SMART Table, end-time and start-time (parameter "TABLE ENDTIME").

By combining these two reports (manually or by a user-written program), the exact status of the production environment can be established. Sorting the reports by SMART Tables, which usually represent application systems, makes it easy for production personnel to continue the work manually (by SMART Tables, using the AutoEdit Simulation facility SUBMIT option).

### KSL Log Reports

REP5ALL activates KSL program REPLOGAL. This program prints all the log messages for a specified date. The report's output indicates which jobs did not yet execute.

The following code shows an example of a KSL Log Report:

```
//STEP1 EXEC CTMRKSL
TRACE OFF
MAXCOMMAND999999
CALLMEM REPLGMSG FROMDATE TODATE JOB511I NULL NULL NULL
END
//STEP2 EXEC CTMRKSL
TRACE OFF
MAXCOMMAND999999
CALLMEM REPLGMSG FROMDATE TODATE CTM659I FRM467I SEL208I NULL
END
```

REP5MSGD activates KSL program REPLGMSG. This program prints only relevant log messages for a specific time span. A maximum of four messages can be specified as input parameters. This report must be generated in two steps.

In the STEP1 and STEP2 set the following parameters:

- FROMDATE – Date from which data is extracted, in format (*ddmmyy* or *mmddyy*) used at your site.
- TODATE – Date to which data is still relevant, in format (*ddmmyy* or *mmddyy*) used at your site.

The most practical value for parameter FROM DATE depends on the value of parameter MAXWAIT (for example, if most production jobs do not have a MAXWAIT parameter of more than seven days, parameter FROMDATE must not exceed seven days),

STEP1 prints a list of all the jobs placed on the Active Jobs file (message: JOB511).

STEP2 prints a list of all the jobs that ended OK, were discarded (MAXWAIT exceeded), were held, or were deleted by online users.

By manually combining these two reports, an accurate list of all jobs that must be scheduled and executed can be compiled. This method is complex, error prone, and does not determine the exact order of scheduling. Use this method only if there is no alternative (that is, no other way exists to restore the Active Jobs file).

REP5EXP activates KSL program REPLOGEX. This program can help trace problematic jobs (for example, jobs ending in abends, and so on). Priorities can then be better defined and reasonable throughput maintained.

## Using the Active Jobs File

REP3ALLJ activates KSL program REPJOBST. This program prints a list of the Active Jobs file. It can be used as a general guideline to the planned recovery procedure.

REP3LEFT activates KSL program REPJOBMO. This program prints a list of all jobs in active and problematic status:

|                    |                    |
|--------------------|--------------------|
| 1. WAIT SCHEDULE   | 7. RECOVERY NEEDED |
| 2. WAIT SUBMISSION | 8. DISAPPEARED     |
| 3. SUBMITTED       | 9. ABENDED         |
| 4. WAIT EXECUTION  | 10. UNEXPECTED CC  |
| 5. EXECUTING       | 11. JCL ERROR      |
| 6. ENDED NOT OK    |                    |

Using this report in combination with the state of the jobs in the JES queues (statuses 2 through 5), a manual submission work plan can be devised. This work plan can be executed using the AutoEdit Simulation facility SUBMIT command.

## Automatic Recovery after a System Crash

The following example illustrates an automatic recovery process defined to a job to be used after a system crash. This example uses value \*UKNW in the CODES parameter.

This example assumes that there was a computer crash during the execution of this job. When the Control-M monitor is activated, the recovery program is submitted and a message are sent to the appropriate user.

|                                                    |            |             |
|----------------------------------------------------|------------|-------------|
| ON PGMSTEP ANYSTEP                                 | PROCSTEP   | CODES *UKNW |
| DO COND RESTART-AP-STC                             |            | ODAT +      |
| DO SHOUT                                           | TO TSO-AP1 | URGENCY U   |
| MSG SYSTEM CRASH – AUTO TO FILE RECOVERY IS ACTIVE |            |             |

## Control-D and Control-V

### Initialization, Customization, and Administration Features

This section describes the initialization, customization and administration features that are available for Control-D and Control-V.

Control-D and Control-V share the same customization features, except the IOA Archive Server and the migration mission, which are solely Control-V features. Whenever the text refers to Control-D, the same customization methods apply to Control-V.

### Activating the Control-D Monitor

Control-D and Control-V share the same monitor when both products are installed.

The Control-D monitor usually operates 24 hours a day as a started task (STC) in one and only one computer at an installation. Generally, the monitor is automatically activated as part of the IPL process. To activate the monitor manually, issue operator command

```
S CONTROLD
```

If the monitor is successfully activated, the following message is displayed on the operator console:

```
CTD100I CONTROL-D MONITOR STARTED
```

If you try to activate more than one Control-D monitor with the same database in the same computer environment, the second monitor immediately shuts down and an appropriate message is issued.

For more information, see the Control-D chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

The Printers Control monitor also operates 24 hours a day, but is activated and controlled by the main Control-D monitor. When the Printers Control monitor is successfully activated, the following message is displayed on the operator console:

```
CTD775I monitor-name CONTROL-D PRINTERS CONTROL MONITOR STARTED
```

### Using the zIIP processor by the Control-D Monitor

The Control-D monitor uses the zIIP processor provided that the zIIP parameter is set to 'Y' in the IOAPARM member and the zIIP processor is available. The Control-D monitor uses the zIIP processor for the scheduling and decollation processes.

## Running Multiple Monitors Using Sysplex Support

Sysplex support enables Control-D to run multiple decollation and printer monitors on different images of a Sysplex environment.

In the event that one of the monitors fails, the main control monitor attempts to reactivate the failed monitor according to the parameters in the CTDPLEX member of the Control-D PARM library. If the CTDPLEX member is not present in the Control-D PARM library, all monitors are run on one image without an attempt to reactivate the failed monitor.

The CTDPLEX member contains a separate section for both the decollation and print monitors, each of which contains a separate entry for each monitor. Each entry is comprised of a restart flag and a set of MVS image names, listed in the order that they are used when reactivation is attempted.

Each monitor entry must be at least 10 characters long, using the syntax shown in the following table:

**Table 126 Syntax for Monitor Entries**

| Column | Value                                                                                                                                                            |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Restart flag. Valid values:<br>R - Restart.<br>N or empty (null) - No restart.                                                                                   |
| 2      | Empty (null) character                                                                                                                                           |
| 3–80   | MVS image names. The first image name must begin in column 3. Each image name must be 8 characters. Use spaces to separate multiple image names from each other. |

**EXAMPLE:** [Format of Member CTDPLEX](#)

```

ENABLE=Y

++++DECOLLATION
R OSNAME01 OSNAME02

++++PRINTING
R OSNAME01 OSNAME02 OSNAME03
R OSNAME01 OSNAME02

```

If you are not using SYSPLEX for Control-D, the parameter ENABLE in the CTDPLEX member of CTDPARM must be set to 'N'.

## Monitor Reactivation Process

Secondary monitor reactivation can be accomplished automatically or manually.

## Automatic reactivation

On a regular basis, the main control monitor checks for the availability of all other monitors (secondary). If a secondary monitor is not available (has failed), the main control monitor first attempts to reactivate it on the same MVS image on which the failed monitor was originally running.

If after the first attempt to reactivate the failed monitor it does not become active, the main control monitor tries to reactivate it on the first MVS image listed in the monitor's entry in member CTDPLEX. If this attempt fails, the main control monitor then attempts to reactivate the monitor on the next image on the list. If the reactivation attempt fails after trying all images on the list, the procedure begins again with the first image until the monitor is activated.

When the main control monitor attempts to start, modify, or terminate a secondary decollation or print monitor, it uses the following command:

---

```
ROUTE rte_name {S/F/P} procname
```

---

where *rte\_name* is the destination MVS image name as listed in member CTDPLEX.

If the restart flag is set to either N or is empty, no attempt is made to reactivate the failed monitor.

## Manual reactivation

It is also possible to manually deactivate and reactivate a secondary Control-D Decollation or Printer monitor without closing down all the other monitors active in the Control-D environment.

To manually deactivate a monitor issue operator command

---

```
/F CONTROLD, STOP=monitor_name
```

---

To manually reactivate a monitor that has stopped, issue operator command

---

```
/F CONTROLD, START=monitor_name
```

---

## Activating Generic Processing

When the Control-D monitor is brought up, Generic Classes processing is automatically activated. You may need to activate Generic Classes processing manually after Control-D is brought up. Use caution if you manually activate the Generic option when it has not been activated automatically.

To manually automate Generic Classes processing, issue operator command

---

```
F CONTROLD, STARTGEN
```

---

The following message is displayed on the operator console from which the modify command was issued:

---

```
CTD139I  GENERIC JOB DECOLLATION IS ACTIVE ON CLASSES (class-list)
```

---



## Using Extended Address Volumes

Extended Address Volume (EAV) can be used in Control-D and Control-V, provided that the corresponding EAVUSE parameters are set to OPT and the EAV space is available.

The EAVUSE parameters override the EATTR allocation parameter of the corresponding file.

The actual allocation on the EAV depends on the SPACE allocation parameter of the corresponding file and the common z/OS or SMS definitions for the EAV volumes.

Note: The z/OS EAV rules are:

- The EAV space is allocated and released by Multiple Cylinder Units (MCU). Each unit usually consists of 21 cylinders (315 tracks).
- The EAV space is preferable if the primary/secondary allocation requests more than the Break Point Value (BPV) space. The BPV space usually consists of 10 cylinders (150 tracks).
- The EAV space is available for SMS and non-SMS files.

The following Control-D and Control-V files are available for allocation on the EAV:

- CTD REPORTS library
- CTD User files and its extents
- Active and Migrated to DASD CDAM and its extents
- Active and Migrated to DASD Index files

The file allocation on EAV is defined by the parameters described in the following table:

**Table 127 Control-D and Control-V EAV files and parameters**

| File                                                                                               | Parameter | Definition                                                                   | Comments                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTD REPORTS library                                                                                | EATTR     | JCL DD parameter.                                                            | Defined by the EAVUSE parameter in the Express Installation or by the EAVUSE#A parameter in the Customized Installation.<br>Can be reallocated manually.                                  |
| CTD Active User file<br>CTD Migrated User file<br>CTD History User file<br>CTD Permanent User file | EAVUSE    | IOADBF utility's parameter.<br>INSTWORK library, DEFxxx and DEFxxxi members. | Defined by the DEAVUSE parameter in the Customized Installation for each User file.<br>Each User file and Index component can be reallocated on EAV separately, using the IOADBF utility. |

| File                                                         | Parameter | Definition                                                             | Comments                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------|-----------|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTD CDAMs                                                    | EAVUSE#C  | CDAM section,<br>CTDPARM<br>member,<br>IOA PARM library                | For Active CDAM: Can be overridden by the EAVUSE parameter in the PRINT/CDAM statement of the decollation mission or the DD SUBSYS job statement of the job.<br><br>For Migrated CDAM: Can be overridden by the EAVUSE#S parameter.<br><br>If omitted, EAVUSE#D is used. |
| CTV Index files                                              | EAVUSE#V  | INDEX section,<br>CTVPARM<br>member,<br>IOA PARM library               | For Active Index file: Can be overridden by the EAVUSE parameter in the PRINT/CDAM statement of the decollation mission.<br><br>For Migrated Index file: Can be overridden by the EAVUSE#S parameter.<br><br>If omitted, EAVUSE#D is used.                               |
| CTV DASD<br>media (Migrated<br>CDAMs and<br>CTV Index files) | EAVUSE#S  | MEDIA section<br>(TYPE=DASD)<br>IOASPRM<br>member,<br>IOA PARM library | If omitted, EAVUSE#C is used for Migrated CDAMs and EAVUSE#V is used for Migrated Index files.                                                                                                                                                                           |
| All CTD<br>CDAMs and<br>CTV Index files                      | EAVUSE#D  | EAV section,<br>CTDPARM<br>member,<br>IOA PARM library                 | The default is NO.                                                                                                                                                                                                                                                       |

## Activating the Compressed Dataset Access Method

The Compressed Dataset Access Method (CDAM) must operate 24 hours a day, because CDAM is used both by the Control-D monitor and by jobs within the system to read, write and view compressed reports. For information about how a job can invoke the Compressed Dataset Access Method, see the CDAM chapter in the *Control-D and Control-V User Guide*.

Usually, CDAM is automatically initialized as part of the IPL process. To activate the Compressed Dataset Access Method manually, issue operator command

**S IOASINIT, OPTIONS=D**

If CDAM is successfully initialized, the following operator message is displayed on the operator console:

```
CTM227I IOA SUBSYSTEM "subsystem-name" INITIALIZATION OF Control-D FUNCTIONS COMPLETED
```

## Activating the IOA Archive Server (Control-V)

To activate the IOA Archive Server, issue the following command:

**S IOASMON**

The IOA Archive Server uses cross-memory services to communicate with other address space requesting services. Like other address spaces using cross-memory services, whenever the IOA Archive Server is shut down, the address space entry in the MVS Address Space Vector Table (ASVT) remains non-reusable until the next IPL, and the message IEF352I is issued (in some MVS versions). If the IOA Archive Server is brought up and down many times, the ASVT may become full. New address spaces do not start, and an immediate IPL may be required.

To prevent this problem, specify a large enough value in MVS initialization parameters MAXUSER, RSVSTRT and RSVNONR in member IEASYSXX in the SYS1.PARMLIB library. For information about these parameters, see the MVS Initialization and Tuning Reference Manual.

## Modifying the Control-D Sleeping Interval

Control-D "wakes up" every few seconds and checks what it has to do. This interval is set through a Control-D installation parameter and can be changed by the system administrator. In addition, the interval can be altered by the following operator command:

**F CONTROLD, INTERVAL=*nn***

where *nn* represents the interval in seconds.

The interval should be modified by automatic commands invoked by the Control-O or Control-M monitor (if present) according to set conditions and time ranges, and not manually by the operator. For sites that do not use the Control-M Production Control System, the commands can be issued through the JES Automatic Commands facility.

At most sites, the interval should be longer during the day (when fewer batch production jobs are executing) and shorter during the night.

When the modification is received by Control-D, the following message is displayed on the operator console from which the modify command was issued:

```
CTD123I Control-D INTERVAL IS SET TO nn SECONDS
```

## Loading the Recipient and Approval Tree

The Recipient and Approval Tree resides in a partitioned dataset. It is loaded by Control-D's various monitors during their startup. In order to replace the current copy of the Recipient and Approval Tree, use the operator commands described in the following topics.

### Loading the Recipient and Approval Tree into the Control-D Monitor

To load a new (modified) Recipient and Approval Tree under the Control-D monitor, enter operator command

---

**F CONTROLD, LOADTREE**

---

Examine the messages that are sent to the operator console. The following message indicates that the tree was loaded successfully:

---

**CTD160I CONTROL-D RECIPIENT TREE LOADED- *nnnnnn* RECIPIENTS**

---

where *nnnnnn* is the number of recipients successfully loaded.

### Loading the Recipient and Approval Tree into the IOA Online Monitor

The recipient tree is also loaded into the IOA Online monitor. To load a new (modified) Recipient and Approval Tree under the IOA Online monitor, issue operator command

---

**F IOAOMON*x*, LOADTREE**

---

where *x* is the unique monitor ID.

If the tree is loaded successfully, the following message is displayed on the operator console from which the modify command was issued:

---

**CTM786I *monitor-name* NEW TREE LOADED. NEW USERS WILL BE SIGNED ON TO THE NEW TREE**

---

When a new Recipient and Approval Tree is loaded, every user who enters the Control-D Online facility starts working with the new tree. However, users who were using the Online facility when the new tree was loaded continue to use the old tree. The old tree is deleted from memory after all users who were accessing it have exited the Online facility.

### Loading the Recipient and Approval Tree into Control-D Application Server

To load a new (modified) Recipient and Approval Tree under the Control-D Application Server, issue operator command

---

**F IOAGATE, MODASID[=*nn*] LOADTREE**

---

where *nn* is the decimal sequential ASID number of the Control-D Application Server address space to which the MODIFY command is submitted. The MODIFY command is broadcast to all active Application Server address spaces if the ASID number '*nn*' is omitted.

## Loading the Recipient and Approval Tree into File Transfer Monitor

To load a new (modified) Recipient and Approval Tree under the File Transfer monitor, issue operator command

---

```
F      CTDFTM,LOADTREE
```

---

If no address space is specified, the modify command is broadcast to all the active serve address spaces related to that specific monitor.

## Reloading the Manual Conditions File

The Manual Conditions file (Screen 7) is created by utility IOALDNRS. This utility scans the Active Missions file and builds a list of prerequisite conditions that must be set manually. For a description of this utility and its parameters, see the *INCONTROL for z/OS Utilities Guide*.

The Manual Conditions file is refreshed (that is, re-created) by each run of utility IOALDNRS. Normally, the utility is activated as the second step of the CTDNDAY procedure. However, the utility can be run more than once a day.

## Deactivating the Control-D Monitor

To shut down the Control-D monitor, issue operator command

---

```
P      CONTROLD
```

---

After a few seconds (a maximum of a minute), the monitor shuts down and the following messages are displayed on the operator console:

---

```
CTD107I SHUT DOWN UPON REQUEST FROM OPERATOR
CTD136I STOPPING THE PRINTERS Control MONITOR monitor-name
CTD779I monitorName Control-D PRINTERS Control MONITOR ENDED
CTD120I Control-D MONITOR SHUTTING DOWN
```

---

Message CTD779I is highlighted. Message CTD120I is highlighted and unrollable.

In case of emergency, you can cancel the Control-D monitor. However, this is not recommended. If the monitor is cancelled, you must also cancel the Printers Control monitors and secondary monitors.

When you shut down the Control-D monitor, all other Control-D facilities (the Compressed Dataset Access Method, IOA Online monitors, IOA Archive Server) and Online facility sessions can remain active.

## Deactivating Generic Processing

It is sometimes desirable to stop Control-D from processing the outputs in the generic classes (usually to replace the current report decollating mission definitions).

Issue operator command

---

```
F  CONTROLD,STOPGEN
```

---

The following message is displayed on the operator console from which the modify command was issued:

---

```
CTD140I  GENERIC JOB DECOLLATION IS BEING DEACTIVATED
```

---

New decollation of generic class output does not start. Currently executing (decollating) missions finish processing those jobs whose output processing already started.

## Automatic Warning

When generic decollation is not active, the Control-D monitor issues the following warning on the operator console:

---

```
CTD271I  GENERIC JOB DECOLLATION IS INACTIVE - CHECK WHY
```

---

This highlighted message is redisplayed every ten minutes as long as there is a job waiting to be decollated in one of the generic classes.

Generic mission deactivation can occur in one of the following ways:

- If started task CTDNDAY fails during the ordering of a generic decollating mission, deactivation is automatic. Check if all the generic decollating missions are in the Active Missions file before reactivating generic processing.
- The operator issues the STOPGEN command (discussed above). Determine why generic decollating was deactivated, and whether it must remain deactivated.
- The Active User Report List file becomes full. Run utility CTDDLRP to delete unnecessary entries from this file.

The spool can become full if there are many generic jobs waiting to be decollated.

## Suspending and resuming the mission process

It is sometimes desirable to suspend all mission processing for all Control-D decollation and print monitors. All resources may be needed for other purposes for a limited period of time without deactivation of the Control-D monitors.

Issue operator command

```
F  CONTROLD,SUSPEND
```

The following message is displayed on the operator console from which the modify command was issued:

---

```
CTD12BI  CONTROL-D MONITOR IS SUSPENDING FOR A OPERATOR REQUEST
```

---

The Control-D monitors do not start any new mission process. The following message is displayed on the operator console when all currently executing missions finish processing:

---

```
CTD12CI  CONTROL-D MONITOR SUSPENDED
```

---

In order to resume all mission processing, issue operator command

F CONTROL,D,RESUME

The Control-D monitors resume a mission process. The following message is displayed on the operator console from which the modify command was issued:

```
CTD12DI CONTROL-D MONITOR RESUMED
```

## Deactivating the Compressed Dataset Access Method

There is seldom any reason to deactivate the Compressed Dataset Access Method. However, if such a reason occurs, it must be done only in conjunction with problem-solving efforts as directed by your BMC Technical Customer. In this case, shut down the Control-D monitor and issue the following operator command:

```
S IOASTERM,OPTIONS=D
```

The following message is displayed on the operator console:

```
CTM231I IOA SUBSYSTEM "subsystem-name" DEACTIVATION OF Control-D FUNCTIONS COMPLETED
```

If the same subsystem supports other INCONTROL products, their functions remain active.

## Deactivating the IOA Archive Server (Control-V)

To deactivate the IOA Archive Server, issue one of the following operator commands:

```
P IOASMON
```

```
F IOASMON,STOP
```

When either of these commands is issued, the IOA Archive Server terminates and an appropriate message is displayed on the operator console.

```
IOA107I IOASMON - SHUT DOWN UPON REQUEST FROM OPERATOR
```

```
IOA10BI IOASMON - IOA ARCHIVE SERVER SHUTTING DOWN
```

## New Day Processing

The Control-D monitor is usually activated as a started task and remains active 24 hours a day. New Day processing consists of automatic cleanup from the previous day's mission ordering and automatic ordering of missions for the current day.

The main components related to New Day processing are

- New Day procedure
- User Daily job
- Date Control records
- Active Missions file

## Starting the New Day Procedure

The New Day procedure CTDNDAY can operate in two modes:

- internal mode (default) – the New Day procedure is performed without shutting down the Control-D decollation and printer monitors. See [Internal mode](#) (on page 376).
- external mode – the Control-D monitor starts the New Day procedure, and then shuts down. See [External mode](#) (on page 377).

CTDNDAY is the default name of the New Day procedure, but it may be changed during installation.

### Internal mode

In this mode, at the predefined time, the Control-D monitor switches to SUSPENDED status and then internally activates the NEWDAY processes.

The Control-D monitors SUSPEND mode means that no new missions will be activated. The monitors do not wait until the decollation missions that are being processed are finished, but the primary monitor does wait until all active backup, migration, and restore missions are finished. The primary monitor also signals the Printers Control monitor to suspend all active printing missions, and waits until the monitor does this.

#### ➤ To run the New Day procedure in internal mode

1. Start the Control-D monitor by issuing one of the following operator commands:

```
S CONTROL D
```

```
S CONTROL D,NDAYMODE=INT
```

At the predefined time, the following message is issued on the operator console:

---

**CTD12AI CONTROL-D MONITOR IS SUSPENDING FOR A NEW DAY**

---

When all processes are suspended (excluding the decollation), the following message is issued on the operator console:

---

**CTD12CI CONTROL-D MONITOR SUSPENDED**

---

The primary Control-D monitor activates the special subtask CTDNDAY, which is the first stage of New Day process, after all Control-D monitors are suspended. This subtask compares the date and time of the computer with the Control-D control files. If they do not match, the following questions are issued on the operator console:



---

**CTD426W CONTROL-D (CTDNDAY) DID NOT RUN FOR *nnnnnn* DAYS**

**CTD427W IS THIS TRUE? (ANSWER "YES" OR "NO")**

**CTD428W YOUR ANSWER IS:**

---

Answer these questions according to the following recommendations:

- If the date and time do not match, and the computer has not been operational for a some time (for example, after a hardware failure or a holiday), you must respond YES.
- If there was no specific reason for the date and time not to match, the computer was probably started with the wrong date. In this case, respond NO, check and if necessary correct the system date, and then restart the Control-D monitor.
- If the system date was correct, the INCONTROL administrator must determine the cause of the problem.
- If the subtask terminates, abends, or fails for any reason, a highlighted, unrollable message is issued on the operator console and the monitor shuts down after the all active decollation missions finish executing.

The CTDNDAY subtask includes the following steps:

- formatting the Active Mission and Active Transfer Files
- deleting unneeded missions from Active Mission File
- ordering missions according to mission lists.

Line CTM34F in the program list separates the first and second stages of the New Day process.

The following message is issued on the operator console after the NEWDAY subtask finishes executing:

---

**CTD12CI CONTROL-D MONITOR RESUMED**

---

2. The Control-D monitor starts the CTDNDAY task, which performs the second stage of the New Day process, with the following command:  
S CTDNDAY,NDAYMODE=INT
3. If this procedure terminates with nonzero return code, or abends or fails for any reason, the INCONTROL administrator must determine the cause of the problem and then restart the CTDNDAY task with the following command:

S CTDNDAY,NDAYMODE=INT

After Control-D starts the CTDNDAY task, the monitor resumes processing of all missions and signals the Printers Control monitor to resume all suspended print missions.

## External mode

In this mode, at the predefined time, the Control-D monitor signals the Printers Control monitor to shut down and waits until the monitor does this, after which the Control-D monitor shuts down. When the Printers Control monitor shuts down, it suspends all active printing missions, which resume only after the Printers Control monitor is restarted.

### ➤ To run the New Day procedure in external mode

1. To run the New Day process in external mode, start the Control-D monitor by issuing the following operator command:

```
S CONTROL D,NDAYMODE=EXT
```

The Control-D monitor and the Printers Control monitor are shut down at a predefined time. The following highlighted, unrollable messages are issued on the operator console:

```
CTD779I monitorName CONTROL- D PRINTERS CONTROL MONITOR ENDED
```

```
CTD113W CONTROL- D MONITOR SHUTTING DOWN FOR A NEW DAY
```

2. Before Control-D shuts down, the CTDNDAY task is activated. This task may display several questions for the operator to answer. After several minutes, CTDNDAY finishes executing and automatically reactivates Control-D using the following command:

```
S CONTROL D,NDAYMODE=EXT
```

In this mode, the CTDNDAY task performs the entire New Day process. If the CTDNDAY task abends or fails for any reason, a highlighted, unrollable message is issued on the operator console and the monitor is not reactivated automatically.

3. The CTDNDAY procedure compares the date and time of the computer with the Control-D control files. If they do not match, the following questions are displayed on the operator console:

```
CTD426W CONTROL- D (CTDNDAY) DID NOT RUN FOR nnnnnn DAYS
```

```
CTD427W IS THIS TRUE? (ANSWER "YES" OR "NO")
```

```
CTD428W YOUR ANSWER IS:
```

Answer these questions according to the following recommendations:

- If the date and time do not match, and the computer has not been operational for a some time (for example, after a hardware failure or a holiday), you must respond YES.
- If there was no specific reason for the date and time not to match, the computer was probably started with the wrong date. In this case, respond NO, check and if necessary correct the system date, and then restart CTDNDAY.

If the system date was correct, the INCONTROL administrator must determine the cause of the problem.

## New Day Procedure Workflow

The New Day procedure performs the following daily maintenance actions:

- cleans unnecessary missions from the Active Missions file

This includes missions that ended OK, missions in wait schedule state whose MAXWAIT parameter has been exceeded, emergency missions that are no longer needed, and so on.

Missions that ended OK can optionally be kept in the Active Missions file until the MAXWAIT period for these missions is exceeded.

- schedules regular and generic decollating missions, printing missions, backup missions, restore missions, and Control-V migration missions

For more information, see [Mission Scheduling](#) (on page 385).

- reactivates the Control-D monitor by issuing operator command (for external New Day mode only)

```
S CONTROL D,NDAYMODE=EXT
```

- deletes the print plan datasets of print missions deleted in step 1.
- updates the IOA Manual Conditions file.

For more information, see the IOALDNRS utility in the *INCONTROL for z/OS Utilities Guide*.

Control-D includes the following actions that are performed as subtasks in internal mode in the first stage of the New Day procedure:

- Clean unnecessary missions from the Active Missions file
- Schedule regular and generic decollating missions, printing missions, backup missions, restore missions, and Control-V migration missions. The limit line of the included program is CTM34F line in the program list.

For more information see [Programs Called During New Day Processing](#) (on page 382).

## User Daily Job

The User Daily job is used to place new missions in the Active Missions file. Each User Daily job usually runs once a day on one or more missions definition members. The missions are selected according to the working date specified to the User Daily job. Therefore, the User Daily job is date-dependent, and certain special situations must be dealt with, such as

- The computer has not been working for a few days (for example, due to holidays, or a hardware or software failure).
- The user wants to run a job or a set of jobs and to process their reports prior to or later than the current working date.

## Date Control Record

Each User Daily job uses a special Date Control record to store the last running date for the User Daily job. A Date Control record is a member in the Control-D PARM library in which relevant date information is placed during New Day processing.

The Date Control record is analyzed by the User Daily job to determine the current running date, the last running date, and possible error situations. This date information is used to manage the ordering of missions during New Day processing.

When a User Daily job is run, the current working date is placed in the Date Control record. In addition, the Basic Scheduling parameters of each mission in the mission lists being ordered are compared to this date to determine if the mission must be placed in the Active Missions file.

The length of a Date Control record is 80 characters. The following table shows the format of the Date Control Record and describes each date in the record:

**Table 127      Format of the Date Control Record**

| Columns  | Date    | Description                                                                                             |
|----------|---------|---------------------------------------------------------------------------------------------------------|
| 1 to 6   | date-1  | Current (or last) original scheduling date.                                                             |
| 8 to 13  | date-2  | Current (or last) original scheduling date of non-generic report decollating missions.                  |
| 15 to 20 | date-3  | Current (or last) original scheduling date of non-generic report decollating missions finish indicator. |
| 22 to 27 | date-4  | Current (or last) original scheduling date of printing missions.                                        |
| 29 to 34 | date-5  | Current (or last) original scheduling date of printing missions finish indicator.                       |
| 36 to 41 | date-6  | Current (or last) original scheduling date of backup or migration missions.                             |
| 42 to 47 | date-7  | Current (or last) original scheduling date of backup or migration missions finish indicator.            |
| 48 to 53 | date-8  | Current (or last) original scheduling date of restore missions.                                         |
| 54 to 59 | date-9  | Current (or last) original scheduling date of restore missions finish indicator.                        |
| 60 to 66 | date-10 | Currently unused.                                                                                       |
| 67 to 72 | date-11 | Finish indicator date of the User Daily job or New Day Procedure.                                       |
| 74-79    | date-12 | Current original scheduling date of generic report decollating missions.                                |

Date format is *mmdyy*, *ddmmyy* or *yymmdd*, depending on the site standard.

## Use of the Date Control Record by the User Daily Job

In some cases, the Date Control record of a User Daily job can be updated through a regular editor. The Date Control record is referenced by DD statement DACHK (in the Daily procedure or CLIST).

The workflow of the User Daily job is dependent on the Date Control record. The User Daily job performs the following main steps:

- checks the last running date of the User Daily job (the internal program CTDCHK)

The first date in the Date Control record (columns 1 through 6) is compared to the current working date (at the time of the run). If they match, the User Daily job has already run today. A message is issued and the condition code is set to 0004.

- If the current working date is earlier than the first date of the Date Control record, a User Daily job run has been attempted before its time. The User Daily job stops executing and notifies the user accordingly.
- If the current working date is later than the first date of the Date Control record (the normal situation), the first date of the Date Control record (columns 1 through 6) is updated to the current working date. This date is then used as the current scheduling date.

If the User Daily job did not run for more than one day, a warning message is issued and the User Daily job tries to schedule the missions for all of the days that have passed since the last scheduling date (according to the production parameters).

- places missions in the Active Missions file according to the current scheduling date and the last running date, through internal programs CTDRRQ, CTDPRQ, CTDBRQ, and CTDSRQ (see [Use of the Date Control Record by the New Day Procedure](#) (on page 381))

Program CTDxRQ works on mission definitions referenced by DD statement DAXxxLST. For each category in the mission, the program checks whether the category must be scheduled on one, or all, days that have passed since the last original scheduling date (date-2, date-4, date-6 or date-8) until the working date in the record (date-1). If the mission must be scheduled, the mission is placed in the Active Missions file.

For example, if a computer did not operate from the 20th to the 23rd, a mission originally scheduled to execute on the 20th was not executed. Program CTDxRQ determines whether the mission must be retroactively scheduled to run on the logical date of the 20th. For more information, see the RETRO parameter in the *Control-D and Control-V User Guide*.

Note: Basic Scheduling parameters are considered only if the FORCE option is not specified.

When the program finishes processing the mission definitions, the finish indicator dates (date-3, date-5, date-7 and date-9) are updated to the working date (date-1) calculated by program CTDCHK.

Before program CTDxRQ starts operating, it compares date-2 with date-3 (date-4 with date-5, and so on). If do not match, a previous run of program CTDxRQ of the same User Daily job has probably abended. The user is notified and the program terminates. To correct the error, adjust the date values in the user Date Control record (using a standard editor).

Note: When manually modifying the Date Control record, make sure that the same missions are not scheduled to run twice on the same day.

- Indicates that the User Daily job has ended (through program CTDPCA)

Program CTDPCA updates the finish indicator date (date-11) by setting it to the running date (date-1). This indicates that the User Daily job finished successfully.

## Use of the Date Control Record by the New Day Procedure

Separate Date Control records are used for the New Day procedure and the User Daily job. The Date Control record for the New Day procedure has one additional date: date-12.

When working under procedure CTDNDAY, the program asks the operator a question regarding the computer's current date. This is to ensure that an incorrect date was not inadvertently entered during the IPL process.

## Programs Called During New Day Processing

Two important programs in New Day Processing are CTDILY and CTDILU:

- the New Day procedure executes program CTDILY
- each User Daily job executes program CTDILU

Programs CTDILY and CTDILU both execute other programs that implement New Day processing. However, program CTDILU (used by User Daily jobs) has less authorization (that is, is not APF-authorized) and calls fewer programs than program CTDILY.

Both CTDILY and CTDILU read the member referenced by DD statement DAPROG and activate the programs listed in the member.

The following is the format for each record in the program:

- columns 01 to 08 – Program name
- columns 10 to 11 – Maximum return code allowable in the preceding program

If a higher return code is encountered in the preceding program, the current program is not executed.

The following table lists the programs called by the program CTDILY (the New Day procedure) and by program CTDILU (User Daily jobs):

**Table 129 Programs called by CTDILY and CTDILU**

| Program | Called By |        | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------|-----------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | CTDILY    | CTDILU |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CTDCHK  | Yes       | Yes    | Checks the current date and its relation to the General Date Control record. The program may communicate with the computer operator to verify that Control-D is activated on the correct date.                                                                                                                                                                                                                                                                |
| CTDFRM  | Yes       |        | Program reformats the Active Missions file. Missions that have already executed and ended OK, missions whose MAXWAIT parameter has been exceeded, and emergency missions that are not needed are erased from the file and the file is compressed. If this program abends, it recovers automatically after startup, using an automatically generated backup copy. For more information, see <a href="#">Parameters of the New Day Procedure</a> (on page 384). |

| Program | Called By |        | Purpose                                                                                                                                                                                                                                                                                                                                                                |
|---------|-----------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | CTDILY    | CTDILU |                                                                                                                                                                                                                                                                                                                                                                        |
| CTDCATF | Yes       |        | Reformats the Active Transfer file. Packets that were transferred successfully, packets whose MAXWAIT parameter has been exceeded, and the corresponding files for these packets are erased from the Active Transfer file. The file is then compressed. If this program abends, it recovers automatically after startup, using an automatically generated backup copy. |
| CTDPRQ  | Yes       | Yes    | Places printing missions in the Active Missions file according to the date in the General Date Control record and the scheduling criteria in the printing mission definitions. The program receives parameters through DD statement DAPRTLST.                                                                                                                          |
| CTDBRQ  | Yes       | Yes    | Places backup and migration missions in the Active Missions file according to the date in the General Date Control record and the scheduling criteria in the backup and migration mission definitions. The program receives parameters through DD statement DABKPLST.                                                                                                  |
| CTDSRQ  | Yes       | Yes    | Places restore missions in the Active Missions file according to the date in the General Date Control record and the scheduling criteria in the restore mission definitions. The program receives parameters through DD statement DARSTLST.                                                                                                                            |
| CTDGRQ  | Yes       |        | Places generic decollating missions in the Active Missions file according to the date in the General Date Control record and the scheduling criteria in the generic decollating mission definitions. The program receives parameters through DD statement DAGENLST.                                                                                                    |
| CTDRRQ  | Yes       | Yes    | Places non-generic decollating missions in the Active Missions file according to the date in the General Date Control record and the scheduling criteria in the report decollating mission definitions. The program receives parameters through DD statement DAREPLST.                                                                                                 |

| Program | Called By |        | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------|-----------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | CTDILY    | CTDILU |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| CTM34F  | Yes       |        | <p>For internal mode:</p> <p>Finish the first stage of the NEWDAY process and activate the CTDNDAY started task in internal mode. Process the following programs from the list under the CTDNDAY started task.</p> <p>For external mode:</p> <p>The CTDNDAY started task executes operator commands (system, JES, VTAM, and so on) from a list (ddname DA34F). The default command, which starts the Control-D monitor, is</p> <p>S CONTROL D , NDAYMODE=EXT</p> |
| CTMPDA  | Yes       | Yes    | Records the end of the Daily run.                                                                                                                                                                                                                                                                                                                                                                                                                                |

## Parameters of the New Day Procedure

You can define the parameters of the New Day procedure the special members of the CTD PARM library. The list of these members is specified in the CTDVAR procedure.

Program CTDFRM, activated as part of the New Day procedure, is responsible (among other duties) for erasing all Control-D related conditions from the IOA Conditions file for the current day. Prerequisite conditions are always assigned a date reference (day and month). They can be kept in the IOA Conditions file for a entire year. Therefore, it is necessary to erase them at the beginning of each working day. Otherwise, missions may be triggered because of conditions remaining from the previous year.

It is common to use prerequisite conditions that are not date-dependent, such as IMS-IS-UP, or AR-FILE-OK. It is important that these conditions not be erased. You can supply a list of conditions that are not to be erased through DD statement DAFRMIN. The syntax is

```
IGNORE COND prefix
```

where *prefix* is the name (or mask) of conditions not to be erased. If an asterisk (\*) is specified, no conditions are erased. Multiple IGNORE statements can be specified.

When the Control-M Production Control System is installed at your site, the Control-M Resources file is updated by Control-M.



## Mission Scheduling

Control-D and Control-V manage report distribution at your site through missions defined by the user. Several different types of missions are available, each for a different type of task

- decollation missions
- printing missions
- restore missions
- backup missions
- migration missions (Control-V only)

This section discusses the following topics:

- scheduling methods
- scheduling missions through CTDNDAY
- scheduling missions through a User Daily Procedure
- scheduling a mission manually
- scheduling workflow

## Scheduling Methods

Missions can be scheduled using the following methods:

- automatically by the Control-D New Day procedure (CTDNDAY)  
This is the usual method. (For more information, see [Scheduling Missions Through a New Day Procedure](#) (on page 386).)
- using a batch job (for example, procedure CTDRPDAY for decollating missions)  
The job can be submitted manually or automatically by a scheduler. (For more information, see [Scheduling Missions Through a User Daily Procedure](#) (on page 388).)
- manually from the Mission Definition screen, using the O (Order) and F (Force) options
- manually under ISPF using the Online Utilities panel  
The panel can be invoked directly using a CLIST (for example, CTDMISRQ MIS(REP) for a decollating mission).
- manually under ROSCOE (for example, using RPF CTDRQPRT for a printing mission)
- using a KeyStroke Language utility from the IOA SAMPLE library (for example, BKPORDER for backup missions)

## Scheduling Missions Through a New Day Procedure

The recommended method for scheduling missions uses the New Day procedure (CTDNDAY), because it is activated automatically once a day.

A member in the Control-D PARM library is referenced by a DD statement in the CTDNDAY. This member contains a list of missions that must be scheduled. The Basic Scheduling parameters of these missions are analyzed against the requested scheduling date. If the mission must be scheduled for that day, it is placed on the Active Missions file.

The following table contains the names of the mission list members and the DD statements used to reference each mission type in the New Day procedure:

**Table 130 Mission List Members and Corresponding DD Statements**

| Mission Type        | Member  | DD Statement |
|---------------------|---------|--------------|
| Regular Decollating | REPLIST | DAREPLST     |
| Generic Decollating | GENLIST | DAGENLST     |
| Printing            | PRTLST  | DAPRTLST     |
| Restore             | RSTLIST | DARSTLST     |
| Backup              | BKPLIST | DABKPLST     |
| Migration           | BKPLIST | DABKPLST     |

The records in each member listed above must not contain line numbers. Each of these records has the following format:

```
date libname [missionname catname] [FORCE]
```

where

- *date* is the ODATE (original scheduling date) of the mission, in the format mmddyy, ddmmyy, or yymmdd (depending on the site standard).

The Basic Scheduling parameters of the mission are compared with this date. The Date Control record is not updated.

Specifying an \* (asterisk) indicates that date management is handled automatically by Control-D using the Date Control record.

Parameter RETRO affects the result obtained when the mission's basic scheduling criteria are compared with the last scheduling date of the mission.

- *libname* is the name of the library in which the mission parameters are found. Valid values are
  - specific library name.  
In this case, the library is dynamically allocated.
  - A DD name preceded by an asterisk

The library must be a partitioned dataset with a record length of 80.

- *missionname* is the optional name of the mission (a member in the library)  
Specifying an \* (asterisk) indicates that all the missions (members) in the specified library are analyzed. Using an asterisk eliminates the need to update mission lists to include new missions.
- *catname* is the specific category of the mission is analyzed  
Specifying an asterisk indicates that all categories of the mission are analyzed.
- FORCE is an optional parameter that places mission categories in the Active Missions file with the specified original scheduling date, regardless of basic scheduling criteria. This must be an actual date, not an asterisk.  
  
If you do not include the FORCE parameter, Basic Scheduling parameters of the category of the missions are analyzed against the specified original scheduling date. If the mission must be scheduled on that date, it is placed on the Active Missions file.

Use '/' to specify a comment line.

The following is an example of the JCL (relevant DD statements of procedure CTDNDAY only):

```
//CTDNDAY      EXEC  PGM=CTDI LY
//DACHK        DD    DISP=SHR, DSN=ctd_parm_l i brary(DDATEREC)
//DAREPLST     DD    DISP=SHR, DSN=ctd_parm_l i brary(REPLIST)
```

The Date Control record used in this case is the General Control-D Date Control record.

## Supplied Mission List Members

The following table describes the default mission list members supplied with Control-D:

**Table 131 Default Mission List Members**

| Member   | Description                                              |
|----------|----------------------------------------------------------|
| PRTLST   | Schedules one printing mission (for form STD).           |
| BKPLIST  | Schedules the following backup missions:                 |
| BKP0007D | Back up for 7 days.                                      |
| BKP0031D | Back up for 31 days.                                     |
| BKP0180D | Back up for 180 days.                                    |
| BKP0365D | Back up for 365 days.                                    |
| RSTLIST  | Schedules the following restore missions:                |
| RST0060M | Restore reports every 60 minutes.                        |
| RSTADHOC | Restore reports immediately (for authorized users only). |

You should schedule Generic Decollating missions with procedure CTDNDAY. For more information, see [Decollation Mission Management](#) (on page 392).

## Scheduling Missions Through a User Daily Procedure

You must use the following JCL:

| //         | EXEC | procedure- name                          |
|------------|------|------------------------------------------|
| //DACHK    | DD   | DISP=SHR, DSN=ctd_parm_library(daterec)  |
| //DAxxxLST | DD   | DISP=SHR, DSN=ctd_parm_library(mlistmem) |

where

- *procedure-name* is one of the following:
  - CTDRPDAY for decollating missions
  - CTDPRDAY for printing missions
  - CTDRSDAY for restore missions
  - CTDBKDAY for backup and migration missions
- DAxxxLST is the reference to the member containing the mission list. Same as specified in [Scheduling Missions Through a New Day Procedure](#) (on page 386).
- *daterec* is the name of the Date Control record for the procedure.
 

Each procedure must use its own Date Control record. A Date Control record cannot be shared by two procedures. The Date Control record is referenced by DD statement DACHK and is used to determine the correct scheduling date for selecting missions according to their scheduling criteria. For more information, see [Date Control Record](#) (on page 379).
- *mlistmem* is the name of the member containing the mission list. Same as specified in [Scheduling Missions Through a New Day Procedure](#) (on page 386).

## Scheduling a Mission Manually

Missions are normally scheduled automatically through New Day processing. However, it is sometimes necessary to schedule a mission manually (for testing, special purpose missions, and so on). In addition, it may be necessary to schedule a mission for different scheduling dates (for example, scheduling a mission that was to run on the 1st of next month on the 30th of this month, or rescheduling a mission that ran on the 4th because the entire run has to be performed again on the 5th).

To manually reschedule a mission, we recommend using the O (Order) or F (Force) options of the Mission List screen or using an ISPF online utility. However, to schedule a mission without entering the IOA Online facility, which is supported only under MVS environments, you can use one of the following CLISTs, KSL utilities, or RPFs (for ROSCOE):

**Table 132 Scheduling Missions Manually using CLISTs, KSL Utilities or RPFs (for ROSCOE)**

| Mission Type                      | CLIST              | RPF      | KSL Utility |
|-----------------------------------|--------------------|----------|-------------|
| Decollating (Regular and Generic) | CTDMISRQ MIS (REP) | CTDRQREP | REORDER     |
| Printing                          | CTDMISRQ MIS (PRT) | CTDRQPRT | PRTORDER    |
| Restore                           | CTDMISRQ MIS (RST) | CTDRQRST | RSTORDER    |
| Backup                            | CTDMISRQ MIS (BKP) | CTDRQBKP | BKPORDER    |
| Migration                         | CTDMISRQ MIS (MIG) | CTVRQMIG | MIGORDER    |

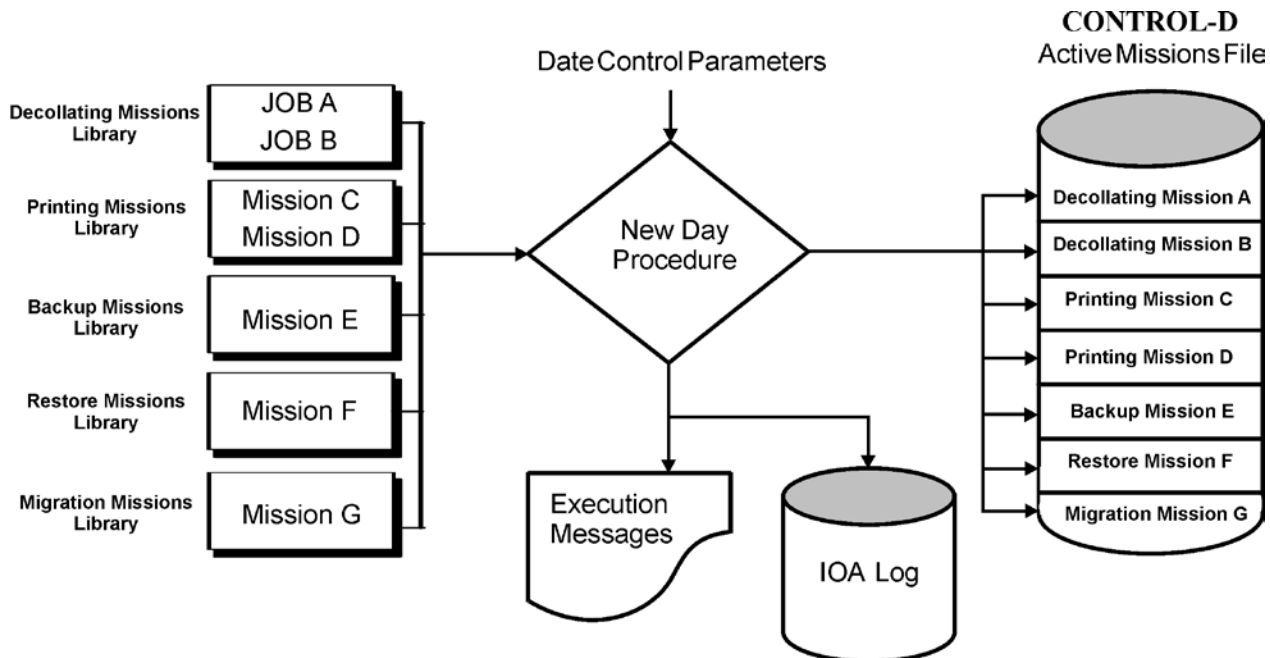
For more information about ISPF Online utilities, see the online facilities chapter in the *Control-D and Control-V User Guide*.

## Scheduling Workflow

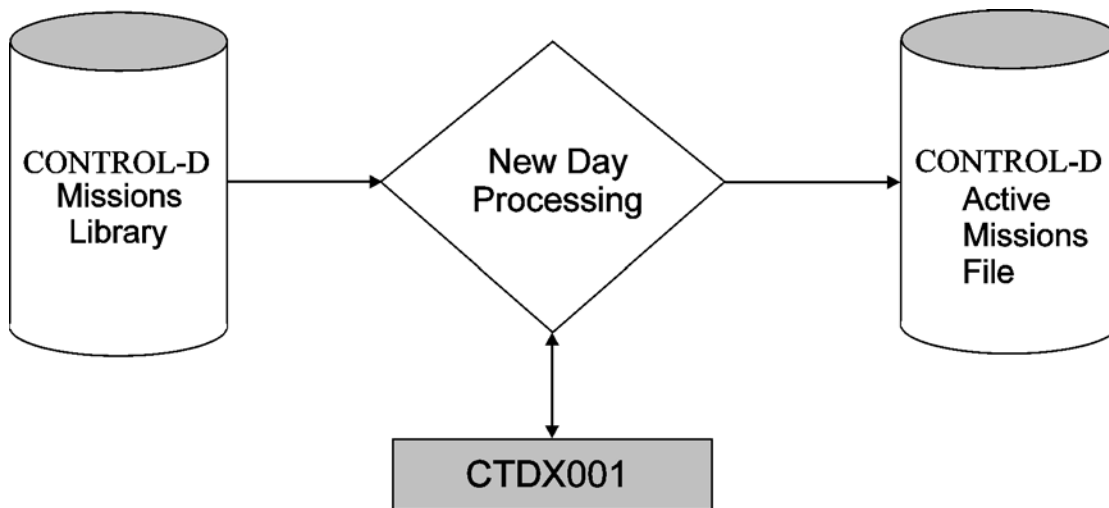
A mission is defined using the Online facility: option R for decollating missions, option M for other missions. Each mission contains parameters that describe the actions to be performed, and when and under what conditions they are to be performed. Mission definitions are stored in libraries (partitioned datasets).

Mission definitions in the library are not active instructions to the Control-D monitor. To make a mission active, it must be placed on the Active Missions file. The process of selecting a mission from the definition library and placing it on the Active Missions file is performed by the Control-D New Day procedure during New Day processing.

The following figure shows how the New Day procedure analyzes mission definitions in a library. According to the basic scheduling criteria specified, appropriate missions are selected, placed in the Active Missions file, and automatically assigned an original scheduling date (ODATE).

**Figure 44 New Day Procedure Analysis of Mission Definitions in a Library**

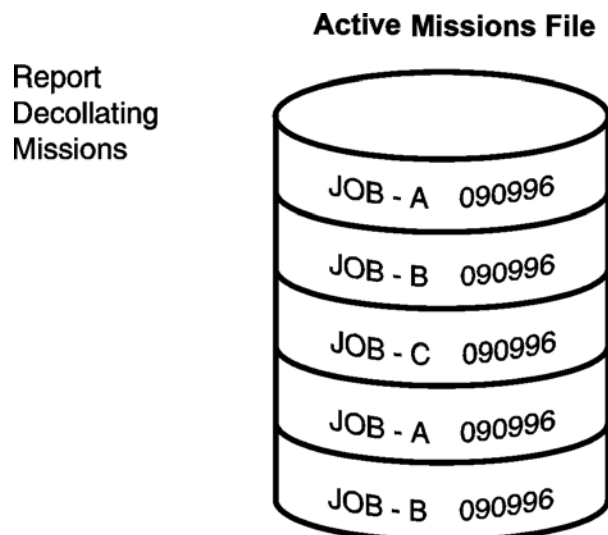
As shown in the following figure, when a decision is made to schedule a mission, its parameters are passed to Control-D user Exit CTDX001. This exit can modify the contents of the parameters or cancel the mission. If the exit does not cancel the mission, the mission is placed in the Control-D Active Missions file.

**Figure 45 Exit CTDX001**

The Active Missions file can contain more than one mission with the same name.

## Examples:

- Several categories exist for the same printing mission. Consider the organization of bundling by a delivery network. A few categories are used, each category describing a bundle with different report recipients. The categories COURIER-NORTH, COURIER-SOUTH, COURIER-AIRPORT are used for the same printing mission. A different list of recipients are bundled under each category. Using this method, a separate bundle is prepared for each category.
- A printing mission is late by more than one day (for example, prerequisite reports have not yet finished). In this case, the Active Missions file contains two printing missions with the same name, but each with a different original scheduling date.
- A daily job is late by more than one day (for example, input tape has not arrived yet). In this case, the Active Missions file contains two report decollating missions for the same job, each with a different original scheduling date.
- The same job is being run several times a day (see the following figure).

**Figure 46 Same Job Run Several Times a Day**

Scheduling of decollating missions can depend on the operation mode of the production control system at your site. It is possible to use all the different modes of operation at the same site. This is usually done to solve special scheduling problems.

The different modes of operation generally vary according to the type of production control system in use. The following situations are possible:

- The production control system is Control-M.
- The production control system is not Control-M.
- There is no production control system.

For a description of how Control-D interacts with production control systems, see [Interfaces to Production Control Systems](#) (on page 398).

## Decollation Mission Management

Regular report decollating missions can handle output from the spool or from CDAM datasets. They are executed once to handle the output produced by a specific job name (unless defined as cyclic report decollating missions, with a task type of CRP).

### Generic Decollating Missions

Control-D provides the option of decollating output from dedicated output classes. Whenever a non-held output exists on the spool in one of the classes defined for generic processing, the Control-D monitor looks for a generic decollating mission that matches the job name, CLASS, DEST, FORM, and EXTWTR of the selected SYSOUT. The search is performed on all generic missions currently in the Active Missions file, which are not held.

Generic decollation is intended for processing non-standard sysouts (for example, MSGCLASS), or reports generated dynamically from a CICS (or similar) environment. A generic decollating mission can process sysouts from a job that is still running at time of decollation, such as SYSLOG files.

### Generic Decollating Mission Workflow

A generic decollating mission can be defined for a specific job name but is usually used in conjunction with a generic job name. A generic job name is specified using mask characters. Execution of the generic decollating mission is triggered by the appearance of a job (whose name matches the job name mask) in a specific output class (in non-held status). These output classes are defined in the Control-D installation parameters. The appearance of a matching job name in other output classes (or in held status in the generic classes) does not trigger the execution of a generic decollating mission.

A generic decollating mission can decollate only from the generic classes defined in the Control-D installation parameters. Any output that is decollated by a generic decollating mission is purged from spool. After decollation, the mission's postprocessing parameters (OUT, SHOUT) are executed, but the mission does not stay in ENDED status. It is recycled for re-execution (that is, it is in WAIT SCHEDULE status).

All runtime scheduling criteria (IN, TIME, PRIORITY) are applicable to generic decollating missions. Usually the recycled generic mission is immediately eligible for execution and is assigned the WAITING FOR JOB status.

SYSOUTs of jobs that appear in a generic class but do not have a matching generic decollating mission name in the Active Missions file are removed from the generic class in one of the following ways, depending on the value specified in Control-D installation parameter GENOTFND:



**Table 133      Removal of SYSOUTs of Generic CLASS Jobs**

| Value                             | Description                                                                                                                                                             |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Values that are valid under JES2: |                                                                                                                                                                         |
| PRIORITY                          | The spool priority of the output is set to one. This allows other output with higher priority to be processed. Default.                                                 |
| DELETE                            | The output is deleted from the spool.                                                                                                                                   |
| HOLD                              | The spool status of the output is altered to hold, preventing it from being processed again by Control-D generic decollation class monitoring.                          |
| CLASS=x                           | The class of the output is altered to the specified class. This class must not be one of the classes specified in parameter GENCLAS.                                    |
| Values that are valid under JES3: |                                                                                                                                                                         |
| DELETE                            | The output for which there is no associated scheduled generic decollation mission is deleted from the spool.                                                            |
| CLASS=x                           | The class of the output is altered to the specified class. This class must be defined as HOLD=EXTWTR. It must not be one of the classes specified in parameter GENCLAS. |

For more information on specifying values for parameter GENOTFND, see the discussion about specifying Control-D parameters, in the Control-D chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

## Additional Considerations

It is possible that more than one generic decollating mission matches the same job. In this case, the missions are processed according to their priority levels. If their priorities are equal, they are processed in the order in which they appear in the Active Missions file (that is, in the order in which they were ordered or scheduled).

When GENERIC=Y and MONITOR is blank, the mission is ordered separately for each monitor and each copy of the mission is assigned a different monitor number (ID). This enables concurrent decollating of generic jobs under more than one monitor.

It is also possible that a match may occur between a generic definition and a regular report decollating mission. This duplication should not create problems, because it is impossible to specify a generic class in an ON CLASS statement of a regular report decollating mission. However, if a regular (ON DSN) report decollating mission is specified with parameter WHEN IN QUEUE=Y, it may never execute, because its job's output is deleted by a generic decollating mission. If WHEN IN QUEUE=Y is specified for a regular report decollating mission, make sure that the job's output is not deleted by a generic mission.

In an environment using a production control system there is a significant advantage in decollating job reports using regular report decollating missions. The decollating of the reports can be made dependent on a prerequisite condition that is added by the production control system after checking that the job has finished executing OK. Using this method, erroneous reports are not decollated. On the other hand, MSGCLASS output of the job (on another class) is best handled by a generic decollating mission.

For example, generic decollating missions can be used to

- handle all MSGCLASS outputs of jobs in the same way (for example, move them from spool to compressed datasets, allow Online Viewing of output, and retain backups for two weeks)
- handle single purpose jobs (for example, decollate output to users based on job prefix)

Control-D first handles regular report decollating missions according to their priority and then scans the generic output classes for outputs. However, this does not guarantee that the regular mission of the same job is executed before a generic one.

## Scheduling Generic Decollating Missions Through the New Day Procedure

Special scheduling of generic decollating missions ensures that all generic missions are scheduled successfully before the Control-D monitor starts generic mission processing. If procedure CTDNDAY fails (for example, the system crashes or there are invalid parameters in generic decollating mission definitions) while processing a report decollating mission from member GENLIST, when the Control-D monitor is started, it does not process generic decollating missions without a manual operator command. If all generic missions are scheduled successfully, decollating of generic missions resumes when the Control-D monitor is brought up.

If generic mission decollating is not active when the Control-D monitor shuts down for a new day (for example, because the operator deactivated it manually), it remains inactive when the Control-D monitor is brought up again.

Generic decollating missions can also be scheduled manually, or by any of the other scheduling methods. However, it is highly recommended not to schedule the missions through the REPLIST member of the New Day procedure with non-generic decollating missions.

## Controlling the Generic Process

You can control generic processing by turning it off and on. This process is performed through operator commands. By default, generic processing is started when Control-D is started (unless it was previously deactivated by an operator command).

One reason that generic processing may be deactivated is if the Control-D New Day procedure (CTDNDAY) fails to schedule the generic missions to the Active Missions file. When generic processing is deactivated, the generic missions do not select output from the defined generic classes.

Generic processing may also be deactivated if an error occurs while updating the Active User file during decollation. In this case generic processing is deactivated to prevent the deletion of sysouts from the spool without the creation of relevant reports in the Active User file.

To stop generic processing, issue the following operator command:

---

```
F  CONTROL D,STOPGEN
```

---

To start generic processing, issue the following operator command:

---

```
F  CONTROLD,STARTGEN
```

---

## Defining a Generic User Name List

Control-D provides an option to specify a generic user name in the report decollation definition. For a detailed description, see the DO USER parameter in the *Control-D and Control-V User Guide*. This option defines a generic name that describes a group of users (for example, all the branches of the bank, senior management, or financial controllers).

A generic user name list resides in a PDS member. The name of the member is referenced in the DO USER statement, preceded by an asterisk (for example, \*BRANCHES). The member must be in a library referenced by DD statement DAGENUSR of the User Daily job (or CTDNDAY). Although, it is possible to use a few generic user name libraries in a distributed environment, it is generally recommended that you use only one to simplify the administration.

Each member in the library represents a generic user name. The contents of the member are lines in the following format:

- column 01 to 05 – TUSER (that is, constant value TUSER)
- column 06 to 09 – blank
- column 10 to 11 – level code of the user (for example, recipient) as defined in the Recipient Tree
- column 12 to 31 – user name

One line is required for each user. Additional lines in the member are not permitted. Do not use columns 73 to 80. Each line must describe a valid user name in the Recipient Tree. Use the main user name, not a synonym.

The following is an example of the member BRANCHES:

---

```
TUSER  30BR101
TUSER  30BR103
TUSER  30BR106
TUSER  30BR112
TUSER  30BR114
TUSER  30BR123
TUSER  30BR127
TUSER  30BR128
TUSER  30BR130
```

---

## Decollating from an IBM WebSphere® MQ Queue

Decollation missions that process IBM WebSphere MQ Queue messages work in essentially the same way as generic decollation missions—an MQ decollation mission is placed in the Active Missions File during ordering, and remains in active status. The mission is then selected by the Control-D monitor when a message from the corresponding MQ queue is available.

MQ messages can be identified by the MQ Queue name in the message header, and by the MQ selection criteria contained in ON MQ statements. For additional information, see the discussion of the MQ and ON MQ parameters in the *Control-D and Control-V User Guide*.

For proper decollation from an IBM WebSphere MQ queue, WebSphere MQ for z/OS must be active on the LPAR where Control-D monitors run.

## Concatenating Required Libraries

Before using MQSeries support in Control-D, the following libraries must be concatenated to the STEPLIB in the IOAENV member of the IOA PROCLIB library:

**Table 134 Libraries to be Concatenated Before Using MQSeries Support**

| Library                                                  | Description                                                                                                                                                                                                   |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Note: All concatenated libraries must be APF authorized. |                                                                                                                                                                                                               |
| prefix.SCSQANLx                                          | This library (where x is the language letter indicator for your national language), must be concatenated before the prefix.SCSQAUTH library in either the STEPLIB DD statement, the JOBLIB, or the LINK LIST. |
| prefix.SCSQAUTH                                          | Main repository for all MQSeries product load modules. The library also contains the SCQZPARM and CSQXPARM default parameter modules.                                                                         |
| prefix.SCSQLOAD                                          | Load library. The library contains load modules for non-APF code, user exits, utilities, samples, installation verification programs, and adapter stubs.                                                      |

## Starting and Stopping MQ Decollation Missions

By default, the MQ Series decollation process begins when Control-D is started. Users can toggle MQ Series decollation off and on through operator commands.

Decollation processing from the MQ Queue might be deactivated if an error occurs while updating the Active User file during decollation. In this case the processing is deactivated to prevent moving messages to the Escape MQ Queue without the creation of relevant reports in the Active user file.

The process might also be deactivated, if decollation 'ENDED NOT OK' and relevant (special) error messages occur.

To stop processing decollation from MQ Series issue the following operator command:

|   |                    |
|---|--------------------|
| F | CONTROL D, STOP MQ |
|---|--------------------|

To start processing decollation from MQ Series issue the following operator command:

|   |                     |
|---|---------------------|
| F | CONTROL D, START MQ |
|---|---------------------|

## How MQ Decollation Missions are Processed

Decollation missions are processed as follows:

- During initialization of MQ decollating missions the Control-D monitor creates a special MQN table. The MQN table, which functions similarly to the GENCLASS list from the CTDPARM library, contains all MQ queue names from the MQ decollation mission definitions.
- The Control-D monitor looks through the MQN table and checks each MQ queue name in the table for a message in the corresponding queue. If a message is not found, the Control-D monitor checks for the next MQ name in the MQN table.

If several Control-D monitors are configured to process the same MQ queue, Control-D needs a synchronization mechanism to avoid having different Control-D monitor processing the same MQ message. For this purpose, the first monitor accessing the MQ queue has exclusive access to it. Until the queue is closed, only that monitor can remove or browse messages from it. After the queue is closed, the MQ queue is accessible to other monitors.

- As soon as a message is found in a queue, the Control-D monitor checks all ON MQ statements of the MQ decollation missions against the descriptor of the received MQ message. If no appropriate mission is found, the message is moved to the MQ escape queue, which is defined in the CTDMQPRM member by the MQNOTFIND parameter. (See [CTDMQPRM Parameters](#) (on page 398).) If there are several MQ decollation mission definitions with the same ON MQ selection criteria in the Active Missions File, only the first one with the highest priority will process the received message.
- A decollation mission begins to work from the selected message if the ON MQ statement matches the descriptor of the MQ message. After the message is processed, Control-D tries to read the next message from the same MQ queue and checks it against the current decollation mission. If the next selected message does not match any ON statement of the current decollation mission, this decollation mission terminates and the Control-D monitor returns to check the next message in queue in the MQN table. The next cycle of MQ message processing will begin after the last rejected message.
- If no appropriate MQ decollation mission is found for selected message, it's moved to special MQ queue defined in MQNOTFIND parameter.

The number of messages that can be processed in one cycle by the same decollation mission is limited by the MAX MSG parameter in the decollation mission definition. The maximum number of cycles is defined by Optional Wish WD2012 (the default is 8).

## How MQ Messages are processed

MQ messages are processed as follows:

- Messages processed by the decollation mission are deleted from the queue during the mission termination process, after the corresponding CDAM files, USER, and SYSDATA records are created.
- Each message selected from the MQ queue is treated as a separate sysout that is selected from the JES spool. This enables the placement of each message in a separate CDAM file, or the placement of an accumulation of messages in JOBSDSN1 and JOBSDSN2 CDAMs.

Processed messages are split into lines in the following manner:

- Binary messages are processed into 32K lines.
- Text messages are processed according to the new line character (NL, CR/LF, LF, CR/NL).

Messages are considered to be text messages if the FORMAT field contains the MQFMT\_STRING value.

## CTDMQPRM Parameters

The CTDMQPRM member contains the following parameters:

**Table 135 CTDMQPRM Parameters**

| Parameter | Description                                                                                                                                         |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| MQMANAGER | Name of the MQ Manager that works with the Control-D monitor                                                                                        |
| MQNOTFIND | Name of the MQ queue where MQ messages will be moved if there are no decollation missions in the Active Mission File that match the MQ message name |
| MQCONFIRM | Name of the MQ queue where confirmation messages should be sent                                                                                     |

## Interfaces to Production Control Systems

Various aspects of Control-D/Production Control System interfaces are explained in the following topics:

- overview of Control-M scheduling with Control-D
- scheduling through the Control-M production control system
- scheduling through a production control system other than Control-M

## Overview of Control-M Scheduling With Control-D

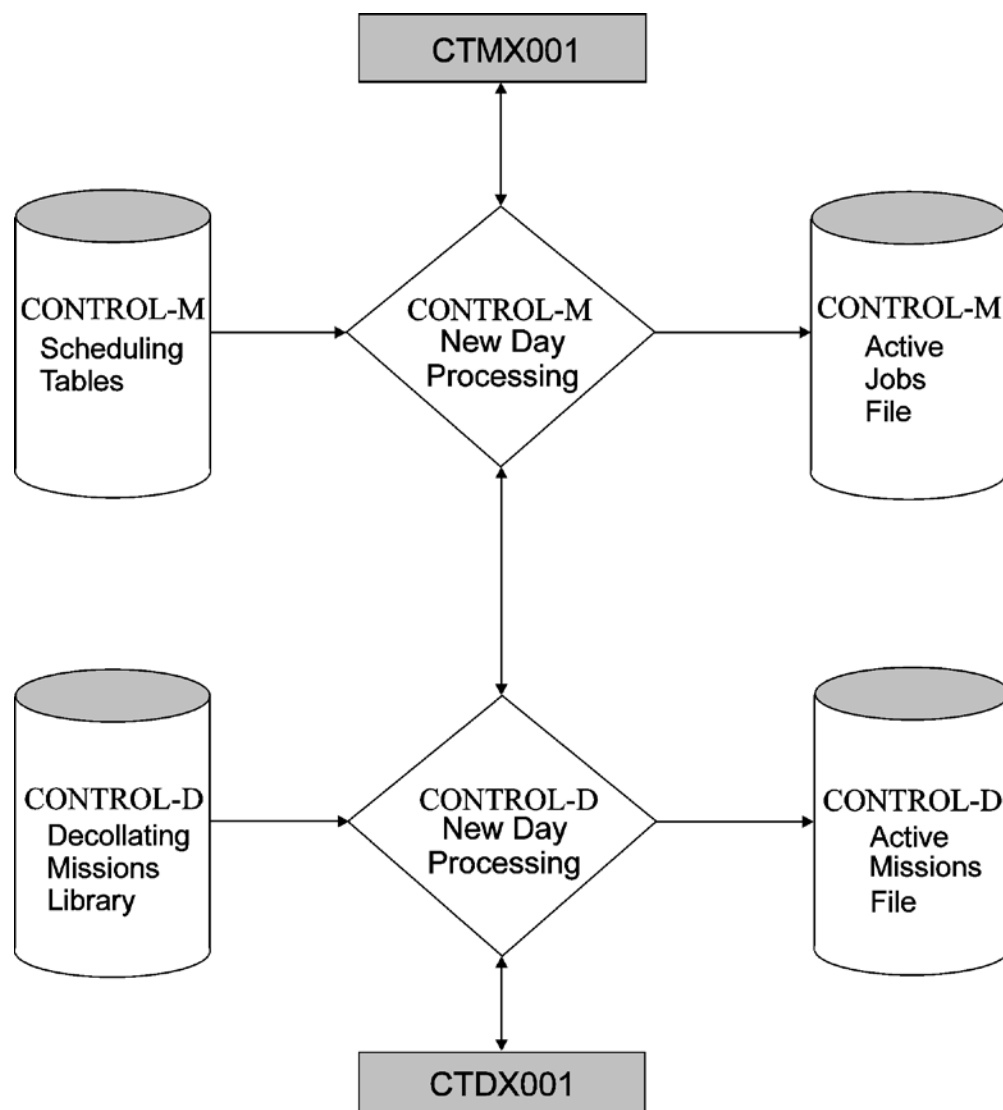
Control-M jobs are scheduled and placed in the Active Jobs file during Control-M New Day Processing. (The job order is submitted when the runtime requirements are satisfied.) The main function of Control-M New Day Processing is to determine whether to execute the job on a specific day. Once that decision is made, the job order is placed in the Control-M Active Jobs file.

The Control-D category field in the Control-M job order is checked. If the category field is not blank, the library referenced by DD statement DAREPMIS is searched for the appropriate report decollating mission. The library is searched for a member with the same name as the Control-M MEMNAME parameter (the Control-D job name), and for the same category as specified in the Control-M category field. If category \* was used, the library is searched for all categories of the specified job name.

In this case, the scheduling criteria of the Control-D report decollating missions (if any) are ignored. Note that if the CTGFORC parameter of the CTMPARM member in the IOA PARM library is set to NO, selected categories are scheduled (that is, not forced). Report decollating mission parameters are passed to Control-D User Exit CTDX001. This exit may alter the contents of the parameters or cancel the decollating mission. If the report decollating mission is not cancelled by the exit, the report decollating mission is placed in the Control-D Active Missions file. The original scheduling date assigned to the report decollating mission is the same as that of the Control-M job order.

The following figure shows Control-M Scheduling with Control-D:

**Figure 47 Control-M Scheduling with Control-D**



## Usage Instructions

The library containing report decollating mission definitions is referenced by DD statement DAREPMIS. This DD statement is normally included in the Control-M User Daily job. However, if jobs ordered through the New Day procedure have decollating missions, DD statement DAREPMIS must also be included in the Control-M New Day procedure. Add DD statement DAREPMIS wherever it may be needed, for example, to procedures/batch utilities CTMTDAY, CTMDAILY, CTMJOBPR, CTMAPI, CTMJOB, the CLIST CTMCJOBS, the Online monitor, KSLs which perform ordering functions and so on.

More than one partitioned dataset can be referenced by each DD statement DAREPMIS (in a job or CLIST). If a library is not referenced, an error message is produced and the Control-M New Day procedure or the User Daily job skips to the next job.

If you want to use more than one library to store definitions of report decollating missions, more than one Control-M Daily can be used. This usually corresponds with using more than one Control-M scheduling library (for security reasons).

Example - Relevant DD Statements Only

### Control-M User Daily Job 1

|            |      |                                                     |
|------------|------|-----------------------------------------------------|
| //USER01   | EXEC | CTMDAILY                                            |
| //DACHK    | DD   | DISP=SHR, DSN=parm-library-1(date-Control-record-1) |
| //DAJOB    | DD   | DISP=SHR, DSN=scheduling-library-1(table-1)         |
| //         | DD   | DISP=SHR, DSN=scheduling-library-1(table-2)         |
| //         | DD   | DISP=SHR, DSN=scheduling-library-1(table-3)         |
| //DAREPMIS | DD   | DISP=SHR, DSN=report-definitions-library-1          |
| //DAAMF    | DD   | DISP=SHR, DSN=the-Control-D-active-missions-file    |

### Control-M User Daily Job 2

|            |      |                                                     |
|------------|------|-----------------------------------------------------|
| //USER02   | EXEC | CTMDAILY                                            |
| //DACHK    | DD   | DISP=SHR, DSN=parm-library-2(date-Control-record-2) |
| //DAJOB    | DD   | DISP=SHR, DSN=scheduling-library-2(table-1)         |
| //         | DD   | DISP=SHR, DSN=scheduling-library-2(table-2)         |
| //DAREPMIS | DD   | DISP=SHR, DSN=report-definitions-library-2          |
| //DAAMF    | DD   | DISP=SHR, DSN=the-Control-D-active-missions-file    |

For a full description of Control-M New Day processing, see [Control-M](#) (on page 193).

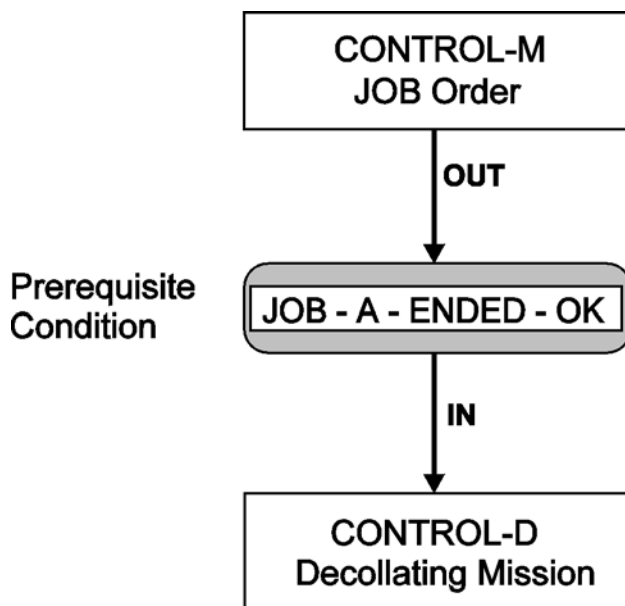
## Job-Report Dependency

It is recommended that you establish dependency between the successful execution of the job under Control-M and the processing of the job's reports by the Control-D report decollating mission. The dependency can be established using a prerequisite condition. Parameter OUT of the job order under Control-M must specify a prerequisite condition to be referenced by parameter IN of the Control-D report decollating mission.



The following figure shows a Job-Report dependency:

**Figure 48 Job-Report Dependency**



## Using Control-M Scheduling Data – Summary

The advantage of invoking the Control-D report decollating missions through Control-M scheduling criteria is that the scheduling criteria only have to be defined once (under Control-M). It is then unnecessary to update the scheduling criteria of Control-D each time the criteria are updated in Control-M. In addition, job orders under Control-M can automatically place report decollating missions in the Control-D Active Missions file.

The job scheduling information is managed by one source of data and control.

## Scheduling Through the Control-M Production Control System

When the Control-M production control system is in use, the integrated environment of Control-D and Control-M can produce optimum results.

In such an environment, the recommended method of scheduling a non-generic report decollating mission is through Control-M scheduling criteria.

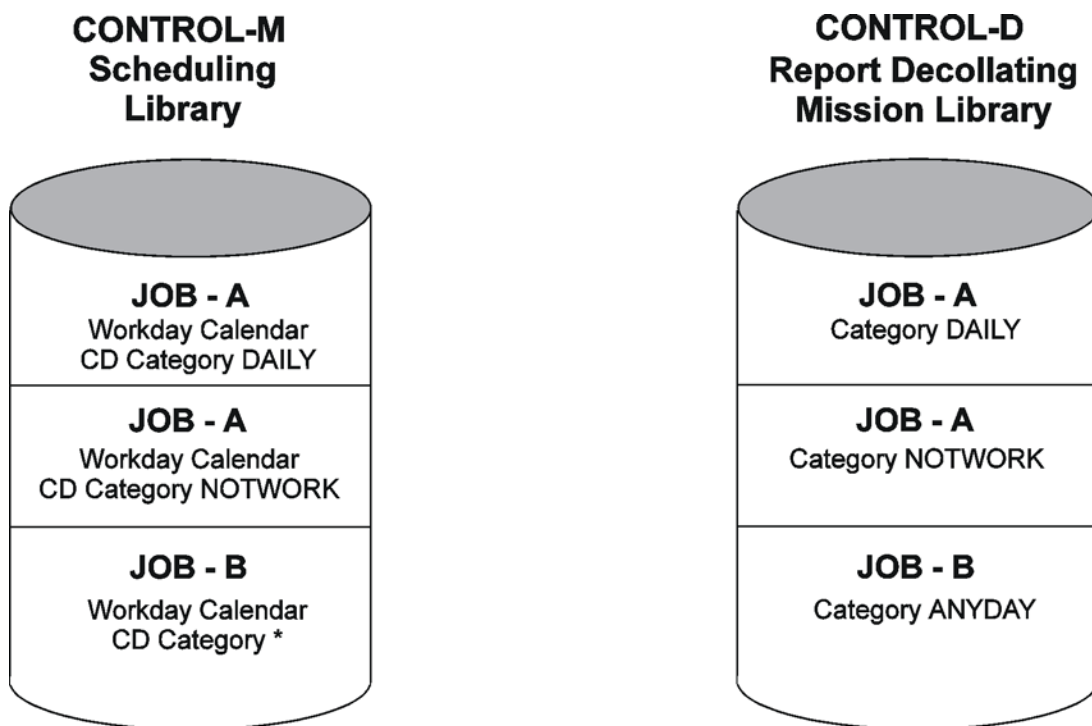
The Control-M Job Scheduling Definition screen contains a field (D-CAT) to indicate that a Control-D report decollating mission must be scheduled whenever the job is scheduled to run under Control-M.

In this field, the user specifies the Control-D category of the report decollating mission that must be selected from the Control-D report decollating mission library. To select all categories of the job, specify an asterisk (\*) in the D-CAT field. (If the D-CAT field is empty, a report decollating mission is not scheduled for the job.)

Each report decollating mission can be composed of a few categories. The category is usually used as a mechanism to specify different report decollating (processing) parameters for different execution days (for example, a regular work day, end of the month).

Based on different scheduling criteria under the Control-M monitor, the same Control-M job order can be used to select different report decollating missions of different categories.

**Figure 49 Control-M Job Order Used to Select Different Report Decollating Missions**



Operating Control-M and Control-D together in the same environment may cause the following situations:

- A job to be run by Control-M does not generate any reports. Therefore, there is no need to process the job by Control-D. In this case, the category field in the Control-M Job Scheduling Definition screen must remain blank.
- A job to be run by Control-M generates a report but does not yet have a report decollating mission defined for the job. (Control-D can be implemented in phases.) In this case, the category field in the Control-M Job Scheduling Definition screen must remain blank.
- A job generates a report that must be decollated by a Control-D report decollating mission. In this case, the name of the Control-D category of the report decollating mission must be defined in the D-CAT field in the Control-M job scheduling definition. An asterisk (\*) can be used to select all categories of the job.

## Scheduling Through a Non-Control-M Production Control System

The primary advantage of invoking Control-D report decollating missions from the user exit of a production control system is that scheduling criteria only have to be defined once (under the production control system). The user does not have to update scheduling criteria of report decollating missions each time they are updated in the production control system.

The following methods can be used to implement Control-D in data centers that use a production control system other than Control-M:

- Control-D scheduling is managed independently of the production control system. This method is the same as managing the scheduling without any production control system.
- The scheduling of report decollating missions under Control-D is controlled by the production control system (described in the following paragraphs).

Most production control systems include some means of passing control to a user exit before a job is submitted. Some products have user exits in earlier stages (when the decision to schedule a job for a specific day is made). The basic idea is to invoke the Control-D report decollating mission from the user exit of the production control system.

Operating a production control system and Control-D together in the same environment may cause the following situations:

- A job that is to be run by the production control system does not have any reports. It does not need to be processed by Control-D.
- A job that is to be run by the production control system does not yet have a report decollating mission defined for the job.
- A job is to be run by the production control system and decollated by Control-D.

To handle the situations mentioned above, the user must use some method of specifying to the production control system user exit whether to issue a report decollating mission for the job. The decision of how to mark a job is local for each installation and can be performed using one of the following methods:

- Specify a flag in a job scheduling parameter of the production control system that is otherwise unused, or is used for another purpose (for example, the job description).
- Use a list accessed by or internal to the user exit. The list must be modified whenever a new report decollating mission is defined.

When the production control system user exit receives control and a decision is made to invoke a report decollating mission, the user exit must activate program CTDRRQ. This program performs a search for the report decollating mission. For more information about program CTDRRQ and its parameters, see [Programs Called During New Day Processing](#) (on page 382).

The search is made for a member name with the same name as the job name and for the specified category. The scheduling criteria of the Control-D report decollating mission (if any) are ignored. The report decollating mission parameters are passed to Control-D User Exit CTDX001. This exit can alter the contents of the decollating parameters or cancel the decollating mission. If the report decollating mission is not cancelled by the exit, it is placed in the Control-D Active Missions file.

## Usage Notes

When a report decollating mission is scheduled by invoking program CTDRRQ from a production control system user exit, the following DD statements must be used:

- STEPLIB – IOA LOAD library (if not included in the MVS Linklist)
- DAAMF – Control-D Active Missions file
- DAOUT – Output print file
- DALOG – IOA Log file
- DAGENUSR – Generic user names library (if this option is used at your site)

If the production control system does not have an appropriate exit or you do not want to use this method to schedule report decollating missions, there is an alternative. Most production control systems can produce a night plan report – a list of jobs to be executed during the night. This list can be used as input to a program that schedules report decollating missions by invoking program CTDRRQ.

The IOA SAMPLE library contains examples of production control system interfaces. Member \$\$INTER in the IOA SAMPLE library contains an index to these interfaces. A user-written interface to CA-7 (UCC7) is not officially supported but is available. For more information about the CA-7 (UCC7) interface and interfaces to other production control systems contact BMC Customer Support.

## Job–Report Dependency

It is recommended that you establish dependency between the successful execution of the job under the production control system and the processing of the job's reports by the Control-D report decollating mission. This dependency can be established using the prerequisite condition concept.

A prerequisite condition (for example, REP-M01AUPD-READY) must be specified in the IN parameter of the Control-D report decollating mission. This condition is added to the IOA Conditions file by the production control system after the job finishes executing successfully.

Use utility IOACND to add a prerequisite condition. This utility can be activated from

- a production control system user exit
- a specially defined successor task of the job under the production control system
- a job step.

It is not mandatory to establish through dependency prerequisite conditions between the production control system and Control-D. If dependency is not established, Control-D processes the reports when the job enters the output queue. It is also possible to use manual prerequisite conditions for report processing when required.

## Considerations for when Control-M and Control-D are installed

The following issues must be considered if both Control-M and Control-D are being installed:

- When both Control-M and Control-D are installed, IOA installation parameter CTM must be set to Y (Yes). When CTM=Y, maintenance of conditions in the Conditions file is handled by the Control-M New Day procedure and not by Control-D. Therefore, it is recommended that the Control-M New Day procedure always run before the Control-D New Day procedure. The Control-M New Day procedure CTMTDAY must delete all conditions from the previous year. The Control-M New Day procedure can receive parameters that control the delete operation through DD statement DAFRMIN.
- You should clean the IOA Conditions file periodically using utility IOACLCND. Use only utility IOACLCND to clean the IOA Conditions because this file is used for both Control-M and Control-D. Use DD statement DACRSIN to assign the parameter control member.
- Utility IOALDNRS builds the Manual Conditions file from information in the Control-M Active Jobs file, the Control-D Active Missions file, and the IOA Conditions and Control-M Resources files. However, the CTDLDNRS utility, which perform the same function, is supplied for compatibility with previous versions of Control-D. The CTDNDAY procedure includes the CTDLDNRS step, which performs the same function after the Control-D missions are ordered.

After any massive ordering of Control-M jobs or Control-D missions (including the Control-M and Control-D New Day procedures), the Manual Conditions file—common to Control-M and Control-D—must be rebuilt. To rebuild the Manual Conditions file, use either the IOALDNRS utility or the CTDLDNRS step. To assign the parameter control member, use DD statement DALNRIN.

If the Control-D and Control-M New Day procedures start at the same time, you need to ensure that both procedures finish before running the IOALDNRS utility or the CTDLDNRS step. Use one of the following options:

- Set Control-D New Day time (DAYTIMED) long enough after Control-M New Day time (DAYTIME) to ensure that Control-M New Day is ended.
- Remove the CTDLDNRS step from the CTDNDAY procedure. Run the IOALDNRS utility after both Control-M and Control-D New Day procedures have finished.

## Printing Mission Management

This section discusses the following topics:

- printing mission workflow
  - printing mission definition
  - preparing the skeleton
- advanced scheduling issues
  - distribution according to scheduling dates
  - report decollating and printing mission dependency
- printer control
  - one-chunk method
  - multi-chunk method

- one-outgroup method (JES2 only)
- opening and closing printers
- printing process
- identifying Control-D chunks on spool (JES2 only)
- printing on AFP (APA) printers
- printing using XEROX LCD5 (DJDE) parameters
- using OUTPARMS for global control of printing characteristics
- printing to a file
  - tailoring exit CTDX005
- advanced ACIF interface facility
  - Advanced Function Presentation Data Stream (AFPDS) and AFP Conversion and Indexing Facility (ACIF)
  - ACIF utility benefits
  - making ACIF accessible to Control-D
  - activating the advanced ACIF interface

## Printing Mission Workflow

### Printing Mission Definition

The following table describes the parameters (specified in the Online facility) that affect printing mission workflow:

**Table 136 Parameters Affecting Printing Mission Workflow**

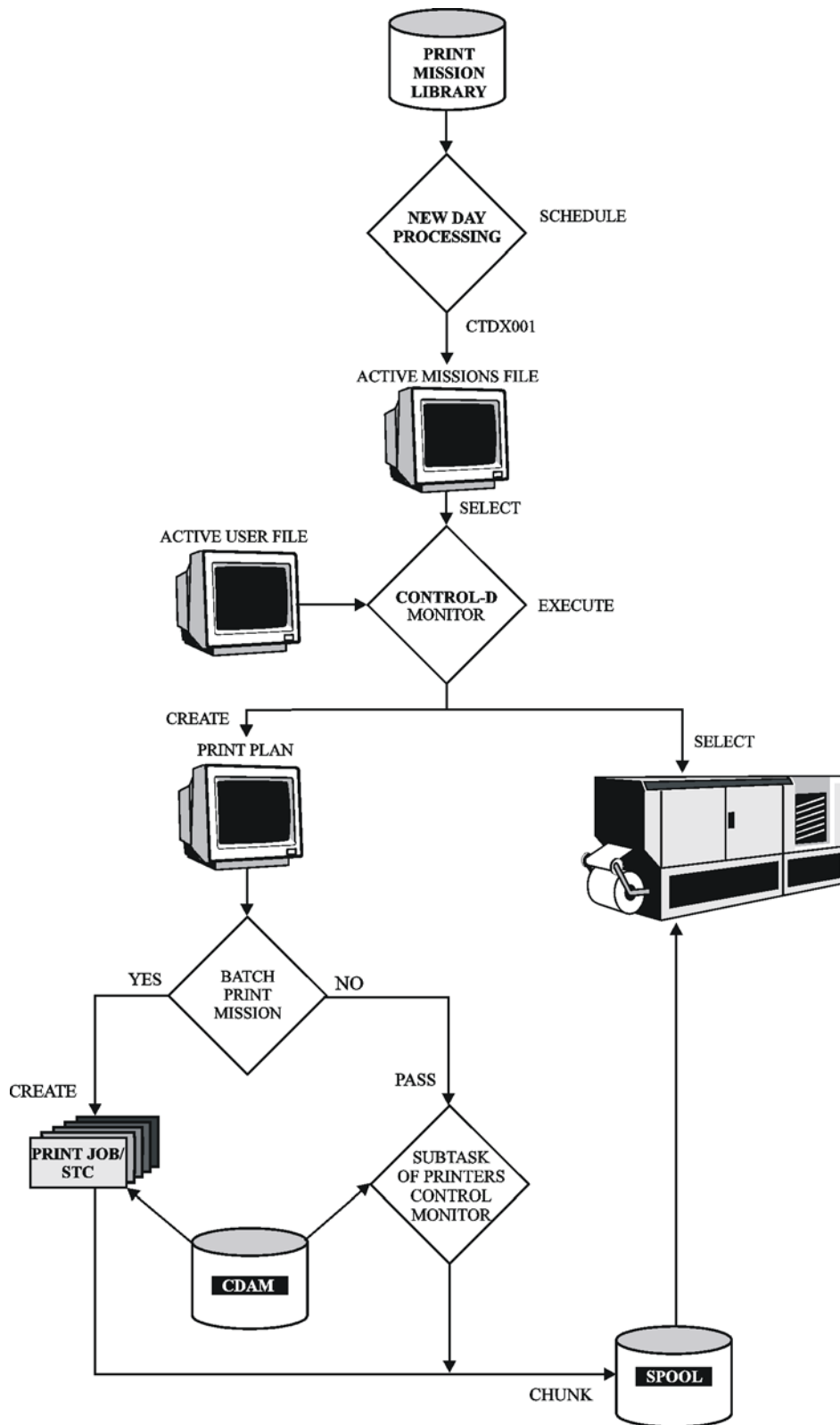
| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BATCH     | Specifies whether a printing mission is submitted as a batch job or as a subtask of a Printers Control monitor. Optional.<br><br>Y (Yes) - Submit the current printing mission as a batch job instead of executing it as a subtask of the Printers Control monitor.<br><br>N (No) - Execute the printing mission as a subtask of the Printers Control monitor. Default.                              |
| SKELETON  | Name of an existing member in the Control-D SKL library. This member contains the job skeleton or started task skeleton for the batch job. Mandatory if BATCH is set to Y (Yes).                                                                                                                                                                                                                     |
| FREE      | SYSOUT allocation mode. Determines whether chunking is implemented and when SYSOUT files are freed. Optional. Valid values:<br><br>CLOSE - Regular chunking mechanism is used. SYSOUT files are freed as soon as they are printed. Default.<br><br>END - SYSOUT files are allocated as usual but are not freed until the end of the batch job. This value is available only if BATCH=Y is specified. |
| TIMEOUT   | mm - Number of minutes within which the printing mission must start. If the mission does not start during the specified time interval, it terminates NOTOK. Default: 5 minutes.                                                                                                                                                                                                                      |

For more information about these parameters, see the *Control-D and Control-V User Guide*.

The defined printing missions are stored in the Print Mission library.

The following figure illustrates the steps of Printing Mission workflow from initial scheduling of the printing mission through the printing of reports:

**Figure 50     Printing Mission Workflow**





A printing mission is executed as follows:

- The Control-D monitor makes a fast scan of the Active User file to locate all reports that require printing by the specified printing mission. The result of this process is a Print Plan file with an entry for each report to be printed.
- In addition, the Control-D monitor selects an available logical printer for this printing mission. When the printer is selected, control is passed to the Printers Control monitor (CTDPRINT) if parameter BATCH was set to N (No), or to a batch job if parameter BATCH was set to Y (Yes).

Chunks are sent to the spool according to the value specified for parameters CHUNKSIZE and OVERRIDE. For further details, see [Printer Control](#) (on page 411).

After printing is completed, the status of each report entry from the Print Plan file is updated in the Active User Report List file according to the printing completion status (for example, Printed or Not printed).

## Processing a Batch Printing Mission

When the report is printed by a batch job, the Control-D monitor reads the member whose name is specified in the printing mission (for example, PRTSKL) from the library referenced by DD statement DADSKL of the Control-D monitor. This member contains a job skeleton or started task skeleton for the batch job.

Because the same library is used for printing, migration, backup and restore mission skeletons, the names of all missions must be unique.

## Preparing the Skeleton

To use a printing mission in batch mode, a skeleton member must be prepared in the Control-D SKL library. The skeleton member can be either a job skeleton or a started task skeleton. For more information, see sample member PRTSKL in the Control-D SKL library.

The skeleton member can contain parameters that are interpreted by the Control-D monitor. The following table describes these parameters:

**Table 137      Skeleton Member Parameters**

| Parameter  | Description                                             |
|------------|---------------------------------------------------------|
| %COM#%     | Number of the COM file record assigned to this mission. |
| %MISSION%  | Mission name.                                           |
| %CATEGORY% | Mission category.                                       |
| %GROUP%    | Mission group.                                          |
| %OWNER%    | Mission owner ID.                                       |
| %PRTY%     | Mission priority.                                       |
| %DEST%     | Mission destination first specification.                |
| %UDEST%    | Mission destination second specification                |

When Control-D finishes preparing the member for submission, control is passed to User Exit CTDX009. This exit can modify the contents of the submitted job (by adding, deleting or modifying the JCL). The exit can return the return codes described in the following table:

**Table 138 Return Codes for Exit CTDX009**

| Return Code | Description                                                                                                                                                                                       |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0           | Submit the job.                                                                                                                                                                                   |
| 4           | Do not submit the job. User Exit CTDX009 can request Control-M to submit the job. Job submission can be done through CTMAJO routines to ensure correct handling of the print job under Control-M. |
| 8           | Do not submit the job. Terminate the mission with NOTOK status.                                                                                                                                   |

Synchronization between the printing mission and the Control-D monitor is achieved by creating a special control subtask for each printing mission in the Control-D address space. (The same method is used to synchronize the Control-D and Printers Control monitors.) This control subtask is synchronized with the corresponding print task through the ENQ mechanism. The QNAME for this ENQ is taken from Control-D installation parameter PRTSTC in member CTDPARM in the IOA PARM library.

To run a batch printing mission on a CPU other than the CPU in which the Control-D monitor runs, this QNAME must be shared through GRS, MIM, or other enqueue manager products.

If parameter PRTMON# is set to 0 in member CTDPARM, no Printers Control monitors are started. In this case, parameter BATCH in the printing mission must be set to Y (Yes).

For additional considerations on running printing missions in batch mode, see [One-Outgroup Method \(JES2 Only\)](#) (on page 413).

Printing missionabend or timeout does not cause termination of Control-D monitors. In such cases, the printing mission terminates with a status of NOTOK.

## Advanced Scheduling Issues

### Distribution According to Scheduling Dates

It is possible to organize printing missions so that each day's printing management (that is, the printing workflow) is the same. The simplest method is to specify DAYS=ALL in the Basic Scheduling parameters of all printing missions. Once a day, when the New Day procedure calls program CTDPQR, all printing missions scheduled for the next 24 hours are placed in the Active Missions file.

This printing organization does not maximize the capabilities of Control-D. You can organize the printing order in different ways for different types of days (for example, weekdays, weekends, end of the month, holidays).

Using Control-D, it is possible to define several copies of the same printing mission. Each copy is an independent definition of the printing mission and can have different scheduling criteria, different runtime criteria, different bundling instructions, different printing configurations, and so on. For example, the (form) STD printing mission does not start later than 05:00 on every workday, does not start later than 04:00 at the end of the month, and is not scheduled for holidays.

Since there is no limit to the number of printing missions that can be defined, the user can organize the printing process to optimally suit every production day of the year.

## Report Decollating and Printing Mission Dependency

We recommend that the printing of bundles by Control-D printing missions depend upon the successful decollation of reports. Dependency can be established using the prerequisite condition concept. Parameter OUT of the report decollating mission must specify a prerequisite condition that is referenced by parameter IN of the printing mission. Using this method, bundles start printing only when all the reports that must be included in them have been decollated.

It is possible to define different report-printing dependencies for different scheduling dates (for example, regular dates vs. end of the month). This can be done by using multiple copies of the same printing mission, each one distinguished by different basic scheduling criteria and different runtime scheduling criteria (prerequisite conditions, time, priority, and so on).

## Printer Control

The following table describes the methods that Control-D provides for printing bundles:

**Table 139 Methods for Printing Bundles**

| Method              | Description                                                                                                         |
|---------------------|---------------------------------------------------------------------------------------------------------------------|
| One-Chunk Method    | Send entire bundle to the spool for printing.                                                                       |
| Multi-Chunk Method  | Send a specified number of lines at a time to the spool for printing.                                               |
| One-Outgroup Method | Send one outgroup (containing all output files produced by a printing mission) at the end of that printing mission. |

### One-Chunk Method

Using this method, the entire bundle is sent to the spool for printing at one time. This method is activated by specifying CHUNKSIZE=0 in the printing mission definition. If not specified in the printing mission definition, CHUNKSIZE defaults to the value defined in installation parameter PRINTER. Specifying CHUNKSIZE=0 suppresses installation parameter OUTGRP.

This method can be used for printing reports that contain identical printing characteristics. If reports that contain different printing characteristics are processed in this manner, the characteristics of the first report are used for all the reports in the bundle.

If the bundle contains reports for different printing destinations, a separate chunk is created for each destination but Control-D does not monitor the printing of the chunk. Control-D continues to send additional chunks of the bundle to the spool.

## Multi-Chunk Method

Control-D creates a new chunk each time the number of lines specified in the CHUNKSIZE parameter is exceeded, or when printing characteristics of the reports change, whichever comes first (unless CHUNKSIZE is specified as "0" as described in "One-Chunk Method"). CHUNKSIZE can be specified in the printing mission definition. If it is not specified in the printing mission definition, CHUNKSIZE defaults to the value defined during the installation process.

For the Multi-Chunk method, the value for the CHUNKSIZE parameter must be greater than 1. The recommended value is 10000. If the CHUNKSIZE parameter is set to 999999, a new chunk will be created only if at least one of the printing parameters is changed. In this case an entire report will be issued to the same chunk.

Multi-Chunk processing provides the following major advantages:

- the ability to print reports with different printing characteristics in the same bundle
- the ability to control the size of the chunk so the spool does not become overloaded

Under the Multi-Chunk method, the printer must be assigned to Control-D using the following JES commands.

### Under JES2

A printer is normally defined as DEST=LOCAL with one or more printing classes. To assign the printer to Control-D, use a JES operator command to initialize the printer with the parameters described in the following table:

**Table 140 JES2 Printer Initialization Parameters**

| Parameter     | Description                                                       |
|---------------|-------------------------------------------------------------------|
| S=N           | No separator (because Control-D creates its own banner pages).    |
| R=destination | This value is set during Control-D installation for each printer. |
| SEPDS=N       | No dataset separator.                                             |
| WS=-Q         | Select from all output classes on which Control-D can print.      |

The following is a sample JES2 operator command:

```
$TPRT1, S=N, R=U1001, SEPDS=N, WS=(- W, - Q, - PRM, - LI M/R, - F, - UCS, - FCB)
```

Verify that the printer has been modified successfully with all the above attributes.

## Under JES3

Change the printer options using an operator command. Initialize the printer with the parameters described in the following table:

**Table 141 JES3 Printer Initialization Parameters**

| Parameter | Description                                                        |
|-----------|--------------------------------------------------------------------|
| B=N       | No burst separator because Control-D creates its own banner pages. |
| WC=class  | The class defined in Control-D installation parameter PRINTCL.     |

The following are sample JES3 operator commands (PRINTCL=Z):

```
*CALL WTR, OUT=04E, H=N, B=N, WC=Z, WS=CL
*S 04E
```

where \* is the JES3 command prefix.

Verify that the printer has been modified successfully with all the above attributes.

## One-Outgroup Method (JES2 Only)

It is possible to combine all the output files produced by a printing mission in one output group. Such a method is useful to ensure that all files are printed together even if the JES printer is not dedicated to Control-D and is used for other jobs as well as for Control-D reports. This method is also useful for output files that are sent through NJE to a remote computer.

To combine the output files, perform the following steps:

1. Run the printing mission as a batch job. (Set parameter BATCH to Y (Yes) in the Printing Mission Definition screen.)
2. Free all sysout files at the end of the job. (Set parameter FREE to END in the Printing Mission Definition screen.)

Note the following:

- The CLASS, DEST, WTRNAME, PRMODE, and OUTGROUP parameters must be the same for all reports included in the printing mission.
  - The OVERRIDE parameter in the Printing Mission Definition screen can be used to assign uniform values to parameters CLASS, DEST and WTRNAME.
  - The PRMODE=PAGE and GROUPID=CONTROL D parameters must be defined in all OUTPUT statements in the Printers Control monitor JCL procedure (CTDPRINT).
3. Set the USERSET parameter to YES in the OUTDEF statement in the JES2PARM member in the SYS1.PARMLIB library.
  4. Verify that the output class is a non-held class.

## Opening and Closing Printers

During installation, a value of OPEN or CLOSE is assigned to parameter PRINTER for each printer. If installation parameter PRINTER is set to OPEN for a printer, it is not necessary to "open" that printer unless it has been "closed" by an operator command.

- To display the entire list of open printers, issue operator command

```
F CONTROL D,STARTPRT
```

If a required printer was defined as CLOSE, issue the following operator command to "open" it:

```
F CONTROL D,STARTPRT,printername
```

where printername is the name assigned to the printer during Control-D installation.

The following message is displayed on the operator console from which the operator command was issued:

```
CTD130I COMMAND "STARTPRT" ACCEPTED FOR PRINTER printername
```

- To "close" a Control-D printer, issue operator command

```
F CONTROL D,STOPPRT,printername
```

When there are no Control-D bundles to print, you can reset the printer's original parameters with a JES command.

It is not necessary to "close" Control-D printers. A printer remains "open" but nothing is printed if the JES2-DEST or JES3-CLASS setting of the printer is not assigned to Control-D.

## Printing Process

When a printing mission is activated manually or automatically, the printing mission creates an index of all reports that are ready to print and that were specified to be printed by this particular printing mission. This index can be viewed and controlled online using the Print Control option (P) in the Active Missions screen. The bundle is then prepared for printing.

Control-D searches for an available printer that was defined in parameter PRINTER of the printing mission definition. If parameter PRINTER has not been specified, Control-D searches for any available printer that was defined in installation parameter PRINTER.

If a printer was defined as CLOSE, an operator command is required to OPEN the printer. For details, see [Opening and Closing Printers](#) (on page 414). If a printer was defined as OPEN or if an operator command was issued to "open" it, Control-D sends the bundle to the spool for printing.

When using the One-Chunk method, the full bundle is created on the spool and waits in queue to print (along with any other output that may be on the spool—that is, non-Control-D output).

When using the Multi-Chunk method, it is recommended that you send only Control-D bundles to the printer at a specified time. If the printer is not assigned exclusively to Control-D when using the Multi-Chunk method, non-Control-D output may be printed in a Control-D bundle. After the bundles finish printing, the printer can be assigned to print non-Control-D output.

Bundle printing can be interrupted using the Print Control option in the Active Missions Status screen. This may be required to immediately print an important non-Control-D output, to change priority of a report printed by Control-D, or to perform any other desired action during the printing process. For a description of this option, see the online facilities chapter in the *Control-D and Control-V User Guide*.

## Identifying Control-D Chunks on Spool (JES2 Only)

Control-D provides the ability to uniquely identify each chunk that is sent to the JES output queue. This is done by appropriately setting the OUTGROUP field (GROUPID in JCL, O-GRP-N in SDSF) for the chunks that Control-D sends to the spool.

Control-D can place the following types of identifiers in the OUTGROUP field:

- original job name of the report
- user name of the user (for example, recipient) who is to receive the report
- printing mission name
- unique time stamp
- specific string specified in the printing mission

To activate this feature, do the following:

1. Add a special OUTPUT statement to the Control-D Printers Control monitor procedure (CTDPRINT). It must be coded as follows:

```
//OUTGROUP OUTPUT GROUPID=CONTROL
```

If the site runs more than one Printers Control monitor (CTDPRIN2, and so on), add this DD statement to all the Printers Control monitor procedures.

2. Add operand GROUPID=CONTROL to all OUTPUT statements in the Printers Control monitor procedures. This operand must be coded in the first operand in the OUTPUT statements.
3. Set the OUTGRP Control-D installation parameter in member CTDPARM in the IOA PARM library, as detailed in the *INCONTROL for z/OS Installation Guide: Installing*.

We recommend specifying OUTGRP=Y, and using the GROUP parameter in the printing mission definition to define OUTGROUP processing. For information about using the GROUP parameter, see the chapter that discusses printing mission parameters in the *Control-D and Control-V User Guide*.

## Printing on AFP (APA) Printers

AFP (Advanced Function Printing presentation) is the standard IBM laser printing technology that supports printers such as the 39xx and 38xx family of printers, and uses APA (All Points Addressable) technology. Throughout this guide and in the *Control-D and Control-V User Guide*, these printers are referred to as AFP printers. The way in which Control-D supports AFP printers is described. For additional information, including instructions for customizing, see the *INCONTROL for z/OS Installation Guide: Installing* and the publication, *Implementing AFP in the Control-D Environment*.

When a sysout is printed on AFP printers, two additional printing control parameters are added: FORMDEF and PAGEDEF. These parameters specify the member name of a form definition and page definition in the FORMDEF and PAGEDEF libraries, respectively. These parameters cannot be defined in a standard DD statement. Instead, they are specified in an OUTPUT statement that is referenced by a DD statement.

Support for PAGEDEF and FORMDEF in Control-D is implemented by either of two methods.

- The first method uses a specified OUTPUT statement and is parallel to the JCL approach.
- The second method uses CDAM PAGEDEF and FORMDEF parameters, is more flexible, and is easier to use.

## Using CDAM PAGEDEF and FORMDEF Parameters

Under Control-D you can specify parameters FORMDEF and PAGEDEF without actually using an OUTPUT statement. When writing directly to a CDAM file, use the CDAM parameters PAGEDEF and FORMDEF. When you decollate a report from spool, use one of the following methods:

- Extract PAGEDEF and FORMDEF directly from spool. Optional Wish WD3066 must be applied for this to work (the default setting)
- Specify the requested PAGEDEF and FORMDEF parameters in the PRINT/CDAM PARMS field of the decollation mission definition
- Define PAGEDEF and FORMDEF in the default record (either the PERMANENT or ACTIVE user file)

This option is not supported when using the One-Chunk method. For more information, see [Printer Control](#) (on page 411).

When using this option, Control-D looks for an OUTPUT statement named CONTROLD or CONTROLF during the printing process and automatically inserts inline FORMDEF and PAGEDEF. This option utilizes the AFP Inline Resource Option.

This method requires that a CONTROLD and CONTROLF OUTPUT statement exist under all printing environments (the Printers Control monitor, the IOA Online monitor, the TSO user, and so on). For site adaptations required for AFP printer support, see the Control-D chapter in the *INCONTROL for z/OS Installation Guide*.

## Using a Specified OUTPUT Statement

The name of an OUTPUT statement containing the FORMDEF-PAGEDEF combination can be specified.

- When writing directly to a CDAM file, use CDAM parameter OUTPUT.
- When decollating a report from spool, specify the requested OUTPUT statement in the decollating mission definition PRINT/CDAM PARMS field.
- Dynamically, if Optional Wish WD3133 is activated. If no OUTPUT card was specified either using a decollation mission (using PRINT and CDAM parameters or a Permanent file) nor using the Control-D OUTPARMS library, the OUTPUT statement is dynamically allocated with the parameters PAGEDEF, FORMDEF, GROUPID, FORMS and LINECD. The values for these parameters are obtained from
  - corresponding VSA User and SYSDATA records (after decollation)
  - the Control-D OUTPARMS library

Any OUTPUT specified in the PRINT/CDAM PARMS field overrides any such parameter specified in the DD statement during CDAM file creation.

The name of the OUTPUT statement used is the name under the Printers Control monitor and not the name of the OUTPUT statement in the job that created the sysout.



When using this method, Control-D searches for the specified OUTPUT statement and uses it to print the report. An OUTPUT statement must exist under all printing environments (Printers Control monitor, IOA Online monitor, TSO user, and so on) for every combination of FORMDEF and PAGEDEF that is in use. For site adaptations required for AFP printer support, see the Control-D chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

## AFP Page Mode Output

Any AFP report (including Page Mode reports) can be decollated by Control-D. Decollating includes identifying each page of a report with identifying strings and assigning the pages to recipients accordingly. Control-D recognizes page breaks in AFP Page Mode output (CATEGORY 5).

Searching for a string in Page Mode output can be performed on the entire line of data, as supported by AFP (from column 1 to column 32767).

Page Mode output is usually produced by DCF (IBM's mainframe word processor) when making Composed AFP documents, by GDDM and other software tools (such as SLR) that use GDDM for producing graphic reports and PostScript output (translated to AFP Structured Fields), and by application programs.

## Page Markers Under AFP

Page Markers for differentiating between user bundles (through print perforation markers) can be initiated using standard methods with most printers. For details, see the publication, *Implementing AFP in a Control-D Environment*. The exception is the 3800-3 printer. For special 3800-3 printer Page Markers, see member DOCDPAGM in the IOA DOC library.

## In-Stream AFP Control Statements

A major feature of Control-D is the automatic insertion of AFP control parameters in-stream in reports. This feature is especially useful for the following situations:

- when implementing advanced AFP options

AFP control parameters (structured fields) can be inserted in reports without modifying application programs.

- when AFP control parameters are contained at the beginning of the sysout, and the sysout is decollated into different users' bundles

AFP control parameters are normally missing from all but the first user bundle. This feature can verify that AFP control parameters are automatically inserted in each user's bundle.

This feature operates as follows:

- A special library is used to define the AFP control parameters of each report. This library is referenced by DD statement DAAPA of the Printers Control monitor. The original name supplied is OLPREFD.APAPARM.
- You can define the library as RECFM=V or RECFM=F. By default, it is defined as RECFM=V. You should use this default definition because, if you use an APAPARM library with RECFM=F, you must add four bytes (RDW) before every AFP control parameter and before command IMM/IDM.

- The APAPARM library contains one member for each job that produces output to be printed on AFP printers. The member name must be identical to the job name. Each member contains AFP control parameters for all reports produced by the job.

If you use the APAPARM option for Online printing, be sure your online environment (for example, IOA Online monitor, TSO Logon procedure) is referenced by DD statement DAAPA.

- In each member, there must be one line in the following format for each AFP report produced by this job:

++++repname (++++ starts in column 1)

where

++++ identifies the line as a report name line

*repname* is the name (or mask) of the report (maximum length: 50 characters). *repname* must be the same as the name of the report specified in Report Decollating parameter DO NAME

Any number of ++++repname lines can be present in one member (that is, several reports can be produced by the same job).

- Following the ++++repname line, one or more AFP control parameters records may follow.

Any AFP command can be specified in its original AFP hexadecimal format. The following special commands can also appear as AFP control parameter records:

- IMM=copy-group-name  
(maximum length: 8 characters)
- IDM=page-format-name  
(maximum length: 8 characters)

These commands are translated to the appropriate hexadecimal AFP structured fields IMM and IDM.

If you are using APAPARM libraries with RECFM=F, add four bytes (RDW) before every AFP control parameter and before command IMM/IDM.

**EXAMPLE:** Consider the following report decollating mission parameters:

JOBNAME=ARINS1

DO NAME=AR-REPORT-1

DO NAME=AR-REPORT-2

Member ARINS1 in the Control-D APAPARM library can contain the following:

++++AR-REPORT-1

IMM=GROUP1

IDM=PAGFM1

++++AR-REPORT-2

IMM=GROUP2

When Control-D prints the report named ar-report-1, the two lines following the ++++ line are written at the beginning of the report.

When Control-D prints the report named ar-report-2, the last line in the member is written to the report.

Sample member APARARMS is located in the Control-D APARARM library.

Not every job has special AFP control parameters. The library must contain only members for jobs with in-stream AFP control parameters and not for other jobs.

When the Printers Control monitor or a batch printing mission is about to print a report for a user on an AFP printer, it searches for a member name with the same name as the job that produced the report. It looks for the report name in the member, translates any IMM/IDM commands to hexadecimal, and writes all the report's AFP control parameters to the printer (through the spool). AFP printers must be defined as APA in member CTDPARM in the IOA PARM library. For more information, see the Control-D chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

## Printing Using XEROX LCDS (DJDE) Parameters

For many XEROX printer models (9700, 8700, and so on), it may be necessary to specify different printing options using special control records that are inserted in the SYSOUT directed to the printer. These parameters are usually referred to as DJDE parameters. The way in which Control-D supports DJDE parameters is described in the following paragraphs. For additional information, including instructions for local adaptations, see the *INCONTROL for z/OS Installation Guide: Installing*.

A special library is used to define the DJDE parameters of each report. This library is referenced by DD statement DADJDE of the Printers Control monitor. The original name supplied is OLPREFD.DJDEPARM.

The Control-D DJDEPARM library contains one member for each job that produces output to be printed on XEROX printers. The member name must be identical to the job name. Each member contains DJDE parameters for all reports produced by the job.

If you use option DJDEPARM for online printing, be sure your online environment (for example, IOA Online monitor, TSO Logon procedure) is referenced by DD statement DADJDE.

In each member, there must be one line in the format described in the following table for each report produced by this job:

**Table 142      Format of Mandatory Line for Each Report Produced**

| Format              | Description                                                                                                                                                              |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ++++ <i>repname</i> | (+++ starts in column 1)                                                                                                                                                 |
| ++++                | Identifies the line as a report name line.                                                                                                                               |
| <i>repname</i>      | Name or mask of the report (maximum length: 50 characters). <i>repname</i> must be the same as the name of the report specified in report decollating parameter DO NAME. |

One or more DJDE control parameters records may follow the ++++*repname* line.

Any number of ++++*repname* lines can be present in one member (that is, several reports can be produced by the same job).

For example, consider the following report decollating mission parameters:

---

**JOBNAME=ARINS1**
**DO NAME=AR-REPORT- 1****DO NAME=AR-REPORT- 2**


---

 Member ARINS1 in the Control-D APARARM library can contain the following:
 

---

**++++AR-REPORT- 1****IMM=GROUP1****IDM=PAGFM1****++++AR-REPORT- 2****IMM=GROUP2**


---

When Control-D prints the report named ar-report-1, the two lines following the ++++ line are written at the beginning of the report.

When Control-D prints the report named ar-report-2, the last line in the member is written to the report.

Sample member APARARMS is located in the Control-D APARARM library.

Not every job has special AFP control parameters. The library must contain only members for jobs with in-stream AFP control parameters and not for other jobs.

When the Printers Control monitor or a batch printing mission is about to print a report for a user on an AFP printer, it searches for a member name with the same name as the job that produced the report. It looks for the report name in the member, translates any IMM/IDM commands to hexadecimal, and writes all the report's AFP control parameters to the printer (through the spool). AFP printers must be defined as APA in member CTDPARM in the IOA PARM library. For more information, see the Control-D chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

## Printing XEROX normalized reports

To enable printing XEROX normalized reports do the following:

- Change the current PROMET JSL member according to the description provided in the PROMET member in the IOA SMPREPS library.
- Change the DEFDJDE member found in the Control-D DJDEPARM library as follows:  
+++TRNEND - RSTACK according to parameter RSTACK TEST from PROMET.

## Using OUTPARMS for Global Control of Printing Characteristics

The Control-D Global Control of the Printing Characteristics option provides the ability to override the default printing characteristics (specified at decollation time) for all (or some) of the reports and banners to be printed by Control-D. This option is for deferred printing as well as for immediate printing. The following table lists the printing characteristics that can be controlled:

**Table 143 Controllable Printing Characteristics**

| BURST | CHAR4 | FCB     | FORMS            | PAGEDEF |
|-------|-------|---------|------------------|---------|
| CHAR1 | CHARS | FLASH   | MODIFY/<br>MODIF | TRC     |
| CHAR2 | CLASS | FLASC   | OPTCD            | UCS     |
| CHAR3 | DEST  | FORMDEF | OUTPUT           | UCSOP   |

CHAR1, CHAR2, CHAR3, and CHAR4 define specific character sets. CHARS defines the character set referenced by CHAR1 and nullifies CHAR2, CHAR3, and CHAR4.

The value assigned to DEST is specified in the following format:

---

**node. rmtid**

---

Setting parameter TRC (Table Reference Character) to YES produces the same result as including parameter OPTCD=J in the JCL.

The Control-D OUTPARMS library is used to implement global control of printing characteristics. Control-D applies two-layer search for those characteristics of a report:

- The first search is for a member in the library. The member name can be represented by
  - the name of the job creates the report
  - the name of the mission that prints the report
  - the name of the recipient for whom the report is intended
  - the report destination

All members in the library must be named in the same manner. These four options must not be mixed.

- The second search is carried out inside the member according to the field specified in the User Exits CTDX003 and CTDX014, as described in [Exits](#) (on page 745). The patterns of the search are coded on the identification lines inside the members, and these lines are identified by characters ++++ in the first four columns. A pattern follows these four characters on the line, and may contain \* or ? used as conventional wildcards. In addition, search parameters COPY=*nn* or JOBNAME=*xxxxxxx* can be coded, if necessary, on the second identification line. They must be coded starting in column 25 and must be separated by a space.

Report print characteristics, listed in the above table, are coded on lines that follow the corresponding identification line in an arbitrary order, and must be separated by a space. See the sample members in the OUTPARMS library.

For compatibility with earlier versions, identification lines may be designated by only three + + + characters in the first three columns, followed by a search pattern. In this case, the search pattern cannot be more than 20 characters in length and the COPY=*nn* and JOBNAME=*xxxxxxx* parameters, if needed, must be coded on the same line.

In addition, a special member named \$\$BANCHR is used for banner print characteristics. In this member, a search pattern located on an identification line represents the pattern of a print mission name. A special print mission name, \$ONLINE, is used for immediate printing.

Reports that are not specified in the OUTPARMS library are printed using default characteristics. The same is true for banners.

As an example of how this option can be used, the user can send all the reports that belong to the accounting department to the local printer at the accounting department, specifying the appropriate destination for the reports by the DEST parameter in the OUTPARMS library.

To put the OUTPARMS library into effect, add the OUTPARM and BANNER parameters to the definitions of banner Exits CTDX003 and CTDX014 in the IOA SAMPEXIT library. For more information about these parameters, see Concept.

#### Example

To control the printing characteristics of banners, perform the following steps:

1. Sample member SAMPBANN in the OUTPARMS library describes how to specify the print characteristics that are used for banners. All print characteristics listed in "Using OUTPARMS for Global Control of Printing Characteristics" can be used.

Create member \$\$BANCHR in the OUTPARMS library. This member is used to specify the print characteristics that are used for banners. The following is an example of the contents of this member:

```
+++STD*
OUTPUT=BANNER1
```

In this example, all printing missions whose names start with STD use OUTPUT statement BANNER1 to determine the printing characteristics of the banners. If an asterisk is specified instead of STD\*, all printing missions use OUTPUT statement BANNER1 to determine the printing characteristics of banners.

2. Add OUTPUT DD statements to the Control-D Printers Control monitor procedure (CTDPRINT). For each OUTPUT statement, add the appropriate printing parameters (PAGEDEF, FORMDEF, and so on). For example, assume that member \$\$BANCHR contains the following lines:

```
+++STD*
OUTPUT=BANNER1
+++STD?G
OUTPUT=BANNER2
```

OUTPUT statements BANNER1 and BANNER2 must be added to the CTDPRINT procedure.

3. If the site runs more than one Printers Control monitor (CTDPRIN2, and so on), these OUTPUT statements must be added each Printers Control monitor procedure.

## Printing to a File

Control-D allows you to direct output (a bundle) to a sequential file instead of to the printer. The feature of printing to a file is supported under Control-D using User Exit CTDX005.

### Activating the Facility

There are three recommended methods to route output to a sequential file:

- writing output to a default dataset defined by Control-D.
- defining a target dataset within a print mission.
- defining a target dataset in Exit CTDX005.

### Writing Output to a Default Dataset

1. In the Printing Mission Definition screen, type SEQL-FILE in the CATEGORY field.
2. In Exit CTDX005, enter a blank parameter DSN. A new dataset is created with the following dataset name format:

*prefix.mission-name.Dddmmyy.Thhmmss*

| Variable            | Description                                                            |
|---------------------|------------------------------------------------------------------------|
| <i>prefix</i>       | value assigned to the prefix parameter in Control-D User Exit CTDX005. |
| <i>mission-name</i> | name of the print mission that performs this printing.                 |
| <i>Dddmmyy</i>      | date, in <i>dd-mm-yy</i> format                                        |
| <i>Thhmmss</i>      | time, in <i>hh-mm-ss</i> .format                                       |

If a dataset name is designated in the DSN parameter of Exit CTDX005, the name of the sequential file is taken from the DSN parameter, and not from the print mission.

### Defining a Target Dataset within a Print Mission

Type **SEQL=filename** in the CATEGORY field of the Printing Mission Definition screen, where *filename* is the name (maximum length: 15 characters) of the target dataset.

The exit program appends the output at the end of the existing file (DISP=MOD).

This method ignores the default parameters of Exit CTDX005 and utilizes the characteristics of the existing file, allowing you the flexibility in specifying file characteristics. If the file does not exist, a new file is created (DISP=NEW) utilizing the macro default parameters (as in method above).

If parameter DEST is set to CTDP or CTDPRT, the report is prepared for transfer to a PC even if SEQL=*filename* is specified in the mission definition.

## Defining a Target Dataset in Exit CTDX005

1. In the Printing Mission Definition screen, type SEQL-FILE in the CATEGORY field.
2. In the DSN parameter of Exit CTDX005, enter the desired dataset name. The following AutoEdit variables can be used:

**Table 144 Target dataset AutoEdit variables**

| Parameter | Description                                                                            |
|-----------|----------------------------------------------------------------------------------------|
| %FORM%    | The report form. The first four characters are used to construct the data set name.    |
| %USER%    | The recipient of the report.                                                           |
| %REPORT%  | The report name. The first eight characters are used to construct the data set name.   |
| %REMARK%  | The report remark. The first eight characters are used to construct the data set name. |
| %JOBNAME% | The name of the job that produced the report.                                          |
| %EXTWTR%  | The related external writer name.                                                      |
| %ODATE%   | The originating date of the report.                                                    |
| %DATE%    | The current date in format yymmdd                                                      |
| %TIME%    | The current time in format hhmmss.                                                     |

The Exit program uses the following logic to determine the target dataset name:

- It substitutes the variables in parameter DSN with their values, except variables %DATE% and %TIME%.
- If the obtained string equals to previous one, the previous data set name is used again.
- Otherwise variables %DATE% and %TIME% (if any) are resolved and the obtained data set name is used as a target one.

Like the previous method, if the target dataset already exists (is located in system catalog), the existing dataset will be appended.



## Tailoring Exit CTDX005

Edit member CTDX005 in the IOA SAMPEXIT library. The parameters listed and described in this topic relate to printing to a file. Tailor them to site requirements.

```
CTDUX005 UNIT=SYSDA,
DSN=,
PREFIX=,
PRIVATE=NO,
VOLCNT=,
VOL1=XXXXXX,
VOL2=,
LABEL=,
SPACETY=,
PRIMARY=20,
SECOND=,
RLSE=,
DEFER=,
DEN=,
LRECL=133,
BLKSIZE=1330,
RECFM=FBA,
RULER=NO,
DUMMY=NO,
FOB=NO,
EXPDT=,
TRTCH=,
AFP2FILE=NO
```

### Exit CTDX005 Parameters

**Table 145 Parameters for Exit CTDX005**

| Parameter | Description                                                                                                                                                                                                                                                         |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UNIT      | Unit type – for example, TAPE, 3380 (default is SYSDA).                                                                                                                                                                                                             |
| DSN       | Dataset name for the sequential file (used when the CATEGORY field of the printing mission definition does not specify a dataset name in a SEQL= string). For more information, see <a href="#">Writing Output to a Default Dataset</a> (on page 423).              |
| PREFIX    | The default prefix of the sequential file name (the first qualifier in the dataset name). Length: 1 through 7 characters.                                                                                                                                           |
| PRIVATE   | Indicates whether the output is written to a specified volume or a scratch volume. <ul style="list-style-type: none"> <li>▪ Y (Yes) - The file is written to a specified volume. Default.</li> <li>▪ N (No) - The file is written to a "scratch" volume.</li> </ul> |
| VOLCNT    | Maximum number of tape volumes required for the output dataset (used in conjunction with parameter PRIVATE=YES).                                                                                                                                                    |
| VOL1      | First volume serial number.                                                                                                                                                                                                                                         |

| Parameter   | Description                                                                                                                                                                                                                                                                                                                                             |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VOL2        | Second volume serial number. Optional.                                                                                                                                                                                                                                                                                                                  |
| LABEL       | Tape label type (SL, NL, NSL, AL, AUL, SUL, or BLP). Default: SL.                                                                                                                                                                                                                                                                                       |
| SPACETY     | Allocation type – CYL or TRK. Default: TRK.                                                                                                                                                                                                                                                                                                             |
| PRIMARY     | Primary space allocation. Default: 20.                                                                                                                                                                                                                                                                                                                  |
| SECOND      | Secondary space allocation. Default: 0.                                                                                                                                                                                                                                                                                                                 |
| RLSE        | Unused space release specification.                                                                                                                                                                                                                                                                                                                     |
| DEFER       | Deferred mounting specification.                                                                                                                                                                                                                                                                                                                        |
| DEN         | Tape density – 1600/6250. Default: 6250.                                                                                                                                                                                                                                                                                                                |
| LRECL       | Maximum logical record length. Default: 203.                                                                                                                                                                                                                                                                                                            |
| BLKSIZE     | Maximum block size. Default: 4060.                                                                                                                                                                                                                                                                                                                      |
| RECFM       | Record format (the default is FB).                                                                                                                                                                                                                                                                                                                      |
| DUMMY       | Indicates whether the exit does or does not create a sequential file. <ul style="list-style-type: none"> <li>▪ Y (Yes) - The exit does not create a sequential file. It can be used for other special processing.</li> <li>▪ N (No) - The exit is used to create a sequential file. Default.</li> </ul>                                                 |
| FOB         | Indicates whether FOB printers are supported. <ul style="list-style-type: none"> <li>▪ Y (Yes) - FOB printers are supported.</li> <li>▪ N (No) - (For more information, see the TYPE printer definition parameter in the Control-D chapter of the <i>INCONTROL for z/OS Installation Guide: Installing</i>.) FOB printers are not supported.</li> </ul> |
| RULER       | Indicates whether to include a ruler. <ul style="list-style-type: none"> <li>▪ Y (Yes) - Write the report to a sequential file with the ruler.</li> <li>▪ N (No) - Write the report to a sequential file without the ruler.</li> </ul>                                                                                                                  |
| EXPDT=yyddd | File expiration date.                                                                                                                                                                                                                                                                                                                                   |
| TRTCH       | Indicates whether to compress the output. <ul style="list-style-type: none"> <li>▪ COMP - Use compression mode when writing to cartridges.</li> <li>▪ NOCOMP - Write without compression.</li> </ul>                                                                                                                                                    |

| Parameter | Description                                                                                                                                                                                                                                                                                                          |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AFP2FILE  | <p>Indicates whether the PAGEDEF/FORMDEF resources assigned to the report should be placed in the file when a report is printed to a sequential file.</p> <ul style="list-style-type: none"> <li>▪ YES – Resources are placed in the file.</li> <li>▪ NO – Resources are not placed in the file. Default.</li> </ul> |

## Printing to e-mail

Print mission output can be directed to the MVS SMTP Gateway for distribution of reports through e-mail, as follows:

1. Add a logical printer to the CTDPARM member, specifying SMTP as the destination and MAIL as the printer type.
2. Specify the name of this logical printer in the PRINTER field of the Print Mission Definition screen.
3. (optional) Change mail headers and footers by customizing the \$MREPSTA and \$MREPEND members in the IOA BANNERS library.
4. Use the ADDRESS field in the Control-D Recipient Definition screen to define the e-mail address of each recipient to be reached by e-mail.

Once defined according to this procedure, print missions working on the MAIL logical printer send sysouts to the SMTP spool destination. The SMTP Gateway retrieves these sysouts and processes them according to the mail headers in the \$MREPSTA and \$MREPEND members.

The workflow of e-mail print missions has the following characteristics:

- Each report is put into a separate chunk.
  - There is no chunk control, that is, there is no waiting until previous chunks have been selected by a JES printer.
  - Control-D banner exit CTDX003 prints only the report start and end banners, which are taken from the \$MREPSTA and \$MREPEND members. Other banners are skipped.
  - Banner text is not shifted one position to the right.
  - Block letters are not produced.
5. To attach text reports to e-mails, do the following in the IOA BANNERS library:
    - a. Rename \$MREPSTA to something neutral (for example, \$MREPOLD).
    - b. Rename \$MREPSTT to \$MREPSTA.

## Deferred printing by indexes

Like regular report printing, printing report sections by index (printing the report sections that correspond to index values) can either be performed immediately (using the Immediate Printing option) or later by a print mission (using the Deferred Printing option).

The deferred printing by index feature allows different sections of a report to be distributed to different destinations. This is accomplished by using the CTVUPINV utility to define the appropriate index values. These index values settings are saved in the Permanent User file. For more information about the CTVUPINV utility, see the *INCONTROL for z/OS Utilities Guide*.

The deferred printing process consists of the following procedures:

Use the CTVUPINV utility to define the appropriate index values and save the settings in the Permanent User file.

Order the deferred printing by doing one of the follow:

- Use the PRINT parameter in the DO INDEX statement of a decollation mission definition to specify the name of the printing mission that can print by index.
- Use the PRINT command from the Quick Access panel.
- Use the P command from the On-line screen.

The deferred printing applies to both active and migrated indexes. For more information about these deferred printing methods, see the *Control-D and Control-V User Guide*.

To use deferred printing by index to e-mail, follow the instructions from topic [Printing to e-mail](#) (on page 427), but use the following BANNER members: \$MINDSTA, \$MINDSTT, and \$MIMDEND instead of \$MREPSTA, \$MREPSTT, and \$MREPEND.

## Control-D subscription for report notification and delivery

Control-D/WebAccess end-users can subscribe to specific reports, either receiving e-mail notification when the reports are ready or receiving the actual reports by e-mail or printout. Subscriptions can be defined either by the end-user with Control-D/Webaccess or by the administrator with the CTVUPINV utility for Control-D reports.

### ➤ To enable subscription, prepare the following:

- Modify the CTDSPARM member by defining default destinations and the default PRINT mission for processing the subscribed reports. For more information, see [Report Distribution from Control-D using Control-D/Delivery Server](#) (on page 472).
- Ensure that the text of notification message in the \$\$CTDSAT member of the CTD OUTPARMS library is appropriate. Variables, such as %REPORT%, %JOBNAME%, %RECIPIENT%, and %INDEXV% (for index report), can be used in the notification message.

### ➤ To process subscribed reports, do one of the following:

- Submit the default PRINT mission with the name defined by the PRINT\_NOTIFY parameter in the CTDSPARM member. Until the PRINT mission processes these reports, they will be in WAITING FOR PRINT status.
- Define a DO PRINT mission in the Decollation mission definition and set MUST=S (for full reports) and TYPE=A/E/S (for index reports). (The default PRINT mission defined in the CTDSPARM member is ignored for these reports.) Submit this PRINT mission.

The notification mechanism does not function in Immediate printing mode.

To re-process subscription or notification for an existing report, the end user must order Deferred printing using the 'U.P' screen and specify the SENDREP override destination parameter. The print mission must be activated to process all corresponding subscriptions for this report.

## Using the zIIP processor by the Control-D Printing Monitor

The ZIIPXBMP parameter is provided in the IOAPARM member for offloading Printing Monitor I/O workloads to zIIP with XBM. The default is N, that the I/O workloads are not offloaded to zIIP with XBM.

The XBM modify command allows the Printing Monitor to activate the offloading of eligible I/O workloads from general purpose processors to zIIP processors with XBM. This way XBM address space can be started after INCONTROL address spaces, without requiring the INCONTROL address spaces to be restarted.

For the Printing Monitor, the XBM modify operator command syntax is as follows:

---

```
F CTDCTRLD,XBM
```

---

## Advanced ACIF Interface Facility

The Control-D Advanced ACIF Interface facility automatically converts selected reports to AFP Category 5 data stream (AFPDS) format, making them available for display with the Control-D/Web Access Server.

### AFPDS and ACIF

AFPDS is an AFP Category 5 data stream format that enables reports to be printed on AFP supported devices and platforms. AFPDS can contain graphics, text, images and bar code objects. AFPDS also supports print resources such as fonts, overlays, page segments, form definitions, and page definitions.

ACIF is a utility that is supplied as a standard component of PSF version 2.1.1 and earlier.

### ACIF utility benefits

The major benefits of the ACIF utility are

- converting line mode output to page mode output

ACIF can convert line mode output to full AFP Category 5 data stream (AFPDS) page mode output. AFPDS output can be displayed under Control-D/WebAccess with the AFP Viewing component (technology from the IBM Printing Systems Company).

- indexing reports

ACIF can optionally index reports according to character strings at specified locations in a report. For example, ACIF can produce an index according to account number and client name data contained in a customer statement. The index enables direct access to specific report pages when displayed with Control-D/WebAccess Server.

- saving and archiving external resources

ACIF can create encapsulated AFPDS files that contain all the resources required for AFP printing and presentation. These resources include FORMDEFS, electronic overlays, page segments and fonts. The resources can be combined with the report and index data and saved as a new report file (CDAM file). This file can be printed or viewed at a later date in its original format, without regard to resource availability or subsequent changes to the resource definitions. The file can also be transferred to other sites or platforms for viewing and printing. If transferred to the PC environment or by using Control-D/WebAccess Server, the output can be viewed online.

Control-D supports two utilities to create AFPDS files:

- ACIF of IBM (module APKACIF)
- CIS, from Océ Printing Systems (module SPSPCIS)

For more detailed information, see the *ACIF Application Programming Guide* or any subsequent IBM documentation, or *PRISMAproduction/MVS CIS-Module User's Guide* or any subsequent Océ documentation.

The UTIL=value parameter statement determines whether Control-D will use the ACIF (the default value) or CIS utility to create the AFPDS files.

The UTIL parameter should be defined as the first parameter in ACIFPARM library members.

## Making ACIF Accessible to Control-D

It is recommended that ACIF program module APKACIF be located in the LPA (Link Pack Area) or in an MVS LINKLIST library. Otherwise, all Control-D Printers Control monitor JCL procedures must be manually edited to concatenate the ACIF distribution LOAD library to the STEPLIB DD statement. The default name of the ACIF distribution LOAD library (as documented in the IBM installation instructions for PSF) is PSF.ACIF.AAPKMOD1. For MVS and PSF version prerequisites, see the Control-D chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

## Activating the Advanced ACIF Interface

The CDAM ACIF parameter settings in a report decollating mission definition determine whether Control-D will automatically call ACIF during printing mission processing. If ACIF is called (although the default for this parameter is NO) it applies the appropriate conversion format and determines the destination of the printing mission, as outlined in the following table:

**Table 146 ACIF Parameter Settings**

| ACIF Parameter | Description                                                                                                                                             |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| NO             | Reports are not converted. Default.                                                                                                                     |
| YES            | Reports with destination CTDPC or reports processed by printing mission with STORE parameter set to Y are converted to AFPDS Category 5 format.         |
| ONLY           | Reports with destination CTDPC or CTDS or reports processed by printing mission with STORE parameter set to Y are converted to AFPDS Category 5 format. |
| ALL            | All reports are converted to AFPDS Category 5 format.                                                                                                   |

For further information about the ACIF parameter, see the CDAM chapter in the *Control-D and Control-V User Guide*.

## ACIF Execution Parameters

Parameters for ACIF and CIS are defined in different formats, according to their requests.

- The ACIF format is parameter=*value*.
- The CIS format is parameter (*value*).

Control-D special parameters (UTIL, CTVINDEXxx) are defined in the parameter=*value* format.

ACIF requires parameters at execution time to control the processing of resources and conversion of report data to AFPDS format. Many parameters specified to ACIF are the same as printing parameters specified in JCL statements when printing a job. Some ACIF parameters define the report index that ACIF can optionally compile. Other ACIF parameters are used to specify the names of datasets that contain resource definition members.

ACIF parameter RESTYPE can have the values FDEF, PSEG, OVLY, FONT, ALL, NONE, or any combination of these that does not include NONE or ALL. We recommend specifying RESTYPE=FDEF,PSEG,OVLY. This instructs ACIF to include all the resources except fonts and improves the response time when viewing documents.

These parameters must be read by ACIF from a sequential file or a library member. While some reports can share common parameter settings, most reports require settings that are in some way different from those specified for other reports. Without the Control-D ACIF Interface facility, tracking hundreds or thousands of ACIF parameter files or members becomes an impossible task.

## CTVINDEXXn parameters

The value assigned to each CTVINDEXnn parameter defines a Control-V hierarchical index that incorporates the values of an ACIF main index. The two digit number suffix indicates the Control-V level of the target index that is created during a printing mission with STORE=Y.

In addition, to define deferred printing by index, the PRINT and TYPE values can be assigned to CTVINDEXnn parameters. The PRINT value specifies the name of the print mission that will be used to print by index (that is, print the sections of reports corresponding to the index values). The TYPE value specifies the scope of the print mission, and can be one of the following: E (= Explicitly), A (= All), or S (=Subscribe). When TYPE=E (which is the default), report sections are printed for predefined index values. The predefined index values, subscribed in advanced for printing using the CTVUPINV utility, include specific printing parameters. When TYPE=S, report sections are printed for index values with defined subscribe records. The index values can be subscribed either by the end-user with Control-D/WebAccess or by the administrator with the CTVUPINV utility. When TYPE=A, report sections for all available index values are processed. Report sections for index values subscribed for printing with corresponding printing parameters are printed according to their settings. All other index values are printed according to default parameters of the original report.

For more information about hierarchical index levels and deferred printing by index, see the online facilities chapter in the *Control-D and Control-V User Guide*.

#### Example

Six AFP index names can be converted to Control-V indexes based on the following specifications:

- CTVINDEX01=index-name1
- CTVINDEX02=index-name2 PRINT=print\_mission1 TYPE=E
- CTVINDEX03=index-name3
- CTVINDEX01=index-name4
- CTVINDEX02=index-name5
- CTVINDEX02=index-name6 PRINT=print\_mission2 TYPE=A

These specifications cause the Control-V printing mission to build the following two hierarchical index structures:

**Table 147 Hierarchical Index Structures Example**

| Level   | Index Structure One | Index Structure Two     |
|---------|---------------------|-------------------------|
| level 1 | index-name1         | index-name4             |
|         |                     |                         |
| level 2 | index-name2         | index-name5 index-name6 |
|         |                     |                         |
| level 3 | index-name3         |                         |

The *print\_mission1* print mission will print the report sections corresponding to the index values subscribed for printing.

In addition, the *print\_mission2* print mission will print the report sections corresponding to all the available index values.

Every AFP main index that is not specified in a CTVINDEXnn parameter is converted to a Control-V level 01 main index.



## ACIFINDEXSTORE Parameter

The ACIFINDEXSTORE parameter determines whether original ACIF indexes that were created by APKACIF are stored in the CDAM file that is created by a PRINT mission with a STORE parameter value of Y.

When you specify the default (ACIFINDEXSTORE=Y) the indexes will be stored.

Using a value of N for the ACIFINDEXSTORE parameter improves performance when viewing large AFP report indexes (those created by APKACIF called by PRINT missions with a STORE parameter value of Y) under Control-V, when using Control-D/WebAccess Server and Control-D Page On Demand.

ACIFINDEXSTORE=N is not recommended for users of ACIF indexes through an AFP viewer rather than through Control-V indexes.

## ACIFPARM Library

For the Control-D ACIF Interface facility, ACIF execution parameters are placed in the Control-D ACIFPARM library.

Unlike standard executions of ACIF, the Control-D ACIF Interface facility allows the specification of different parameters for different reports associated with the same job name, printing mission name, and/or recipient (user ID) name, to be kept in a single member of the Control-D ACIFPARM library.

By default, ACIFPARM member names must be identical to a report's original job name. However, as an optional enhancement, the ACIF Interface facility can be modified to associate member names with a report's printing mission name or recipient name.

In each member, one or more sets of ACIF execution parameters can exist for different reports. Each set of parameters, as explained in the table below, must be preceded by a report name (repname) control statement in the following format:

| 1                                                                       | 2 | 3 | 4        | 5    | 6    | 7                            |
|-------------------------------------------------------------------------|---|---|----------|------|------|------------------------------|
| 12345678901234567890123456789012345678901234567890123456789012345678901 |   |   |          |      |      |                              |
| ++++repname                                                             |   |   |          |      |      |                              |
|                                                                         |   |   | unitname | pind | sind | pres sres prep srep c CYL ## |

**Table 148      Format of Report Name (*repname*) Control Statement**

| Field           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ++++            | Indication that this is a report name ( <i>repname</i> ) statement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>repname</i>  | <p>Name of the report (maximum length: 50 characters). The name must be the same as the name of the report specified in parameter DO NAME of the decollation mission that created the report.</p> <p>The report name can be specified explicitly, or can contain the following mask characters:</p> <ul style="list-style-type: none"> <li>▪ * - Any character, group of characters, or no character.</li> <li>▪ ? - Any single character.</li> </ul> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>▪ ABC* - The report name must begin with ABC (that is, prefix).</li> <li>▪ *D - The report name must end with D (that is, suffix).</li> <li>▪ ABC*D - The report name must begin with the prefix ABC and end with the suffix D. Any or no characters may be present between the prefix and the suffix.</li> <li>▪ * - All report names are selected.</li> <li>▪ A?B1 - The report name must begin with a prefix of A and end with a suffix of B1. One character of any value must be present between the prefix and the suffix.</li> </ul> |
| <i>unitname</i> | Work unit name to be used by the Control-D ACIF Interface facility to allocate temporary ACIF index, resource and report data files.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>pind</i>     | Primary space allocation, in tracks, for the temporary ACIF index file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>pres</i>     | Primary space allocation, in tracks, for the temporary ACIF resource file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>sind</i>     | Secondary space allocation, in tracks, for the temporary ACIF index file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>sres</i>     | Secondary space allocation, in tracks, for the temporary ACIF resource file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>prep</i>     | Primary space allocation, in tracks, for the temporary ACIF report data file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Field       | Description                                                                                                                                                                                                                                  |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>srep</i> | Secondary space allocation, in tracks, for the temporary ACIF report data file.                                                                                                                                                              |
| <i>c</i>    | JES output class to which ACIF prints its informational or error message report. If left blank or specified as an asterisk (*), the default MSGCLASS of the Printers Control monitor is assigned.                                            |
| CYL         | Allocation subparameter. Indicates that Control-D will perform dynamic allocation in CYLINDERS for pind, sind, pres, sres, prep, and srep. If the CYL subparameter is not specified, Control-D will request allocation in TRACKS.            |
| ##          | UNIT-COUNT subparameter of the UNIT parameter. Specifies the number of devices for the temporary data set.                                                                                                                                   |
| UTIL        | Name of the product used to create the AFPDS file. Valid values are: <ul style="list-style-type: none"> <li>▪ ACIF. Default.</li> <li>▪ CIS.</li> </ul> The UTIL parameter should be defined as the first parameter in the ACIFPARM library. |

ACIF execution parameters must immediately follow the repname statement.

For more detailed information, see the *ACIF Application Programming Guide* (IBM publication number G544-3824) or any subsequent IBM documentation, or *PRISMAproduction/MVS CIS-Module User's Guide* (Océ publication number U28117-J-Z247-1-7600) or any subsequent Océ documentation.

An ACIPARM library member can contain any number of repname and ACIF execution parameter groups.

Example

Consider the following decollation mission parameters for two reports:

```
JOBNAME=j obname- memb
PRINT/CDAM PARMS=ACIF=YES
  DO NAME=REPORT- NAME1
  DO NAME=REPORT- NAME2
```

Member jobname-memb in the ACIFPARM library can contain the following:

```
++++REPORT- NAME1 .....
ACIF EXECUTION PARAMETER STATEMENTS
    .
    .
    .
++++REPORT- NAME2 .....
ACIF EXECUTION PARAMETER STATEMENTS
```

Default member \$\$\$\$DFLT in the Control-D ACIFPARM library contains default ACIF execution parameters. These parameters control how reports with no specifically associated member in the ACIFPARM library are processed by the ACIF Interface facility.

## Collecting resources for transformation

Before transforming print stream reports, first identify and make available all report resources (either for AFP or Xerox) needed for the decollation. Do this by defining the Resource Library names in the \$\$TRNRES member of the CTD PARM library, using the [\\$\\$TRNRES Syntax](#) (on page 436).

### \$\$TRNRES Syntax

Each entry in the \$\$TRNRES should employ the following syntax:

```
++++Lib_list_name
```

```
Report_Type, Res_Type=libname
```

- *++++Lib\_set\_name*—The Library Set name, where *lib\_set\_name* is a name from 1 through 8 bytes. *Lib\_set\_name* can also be a mask.

This statement can be defined a number of times in the \$\$TRNRES member, each for a different Library Set.

- A set of the following statements, one for each Resource Library:

```
Report_Type, Res_Type=libname
```

The following table lists the valid values for Report\_Type and Res\_Type in these statements:

**Table 149 Report type and Resource type values for TRNRES statements**

| Report Type | Res_Type resource values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AFP         | <ul style="list-style-type: none"> <li>▪ CCP – AFP code page (starting with T1)</li> <li>▪ CDF – AFP coded font (starting with X?)</li> <li>▪ FDE – AFP FORMDEF (starting with F1)</li> <li>▪ FNT – AFP character set (starting with C0)</li> <li>▪ OLY – AFP overlay (starting with O1)</li> <li>▪ PGD – AFP PAGEDEF (starting with P1)</li> <li>▪ TBL – Tables used by the transformer</li> <li>▪ TTF – TrueType fonts if used by the font mapping table</li> <li>▪ ALL – All resource types will be searched for in this library</li> </ul> |

| Report Type | Res_Type resource values                                                                                                                                                                                                                                                                                                                                                             |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| XRX         | <ul style="list-style-type: none"> <li>▪ FRM – Xerox forms</li> <li>▪ LGO – Xerox logos</li> <li>▪ JSL – Xerox JSLs</li> <li>▪ FNT – Xerox fonts</li> <li>▪ IMG – Xerox images</li> <li>▪ TBL – Tables used by the transformer</li> <li>▪ TTF – TrueType fonts if used by the font mapping table</li> <li>▪ ALL – All resource types will be searched for in this library</li> </ul> |
| TXT         | <ul style="list-style-type: none"> <li>▪ TBL – Tables used by the transformer</li> <li>▪ TTF – TrueType fonts if used by the font mapping table</li> <li>▪ ALL – All resource types will be searched for in this library</li> </ul>                                                                                                                                                  |

*libname* is the Resource Library name for the resource type.

All FONTs starting in C1, C2, C3 or C4 should be removed from the resource library.

In the Report Clique, the OS390 - Resource Library List Name parameter (Os390ResourceLibListName) specifies the name of the Library List that will be used for the report. By default, the value is asterisk (\*).

You can define the names of the resource type. The Resource Manager searches all libraries with the same report type (AFP, XRX, TXT) when searching for the default resource. Each library has to be defined in a separate line.

## \$\$TRNRES Examples

The following example shows the recommended basic default entry in the \$\$TRNRES member:

```
++++*
AFP,ALL=CTD.V610.SAMPREPS
XRX,ALL=CTD.V610.SAMPREPS
TXT,ALL=CTD.V610.SAMPREPS
```

For an AFP site you should add to the default entry to all libraries defined for PSF.

If an HFS or NFS directory is defined, needed resources can be taken from either of them, as follows:

- If the report is a Xerox report, use the following definition:  
XRX,HFS=/u/dir/resources
- If the report is an AFP report, use the following definition:  
AFP,HFS=/u/dir/resources

When the Transformer searches for resources, it first searches in the z/OS libraries. If resources are not found in the z/OS libraries, it then searches the HFS directory. Resources within the HFS directory should have extensions in the resource format. While HFS directory names are case-sensitive, resources are not.

The following example shows the entry in the \$\$TRNRES member that indicates the resource format extensions:

```
++++REP1
XRX,FNT=XEROX.FONTLIB
XRX,FRM=XEROX.FORMLIB
XRX,IMG=XEROX.IMAGLIB
XRX,JSL=XEROX.JSLLIB
XRX,JSL=XEROX.GLOBALS
XRX,LGO=XEROX.LOGOLIB
XRX,ALL=CTD.V610.SAMPREPS
XRX,HFS=/u/dir/resources
```

If a JSL resource named JDE21 is not found in XEROX.JSLLIB or in XEROX.GLOBALS the transformer will then search in the =/u/dir/resources directory for a resource named JDE1.jsl.

The following example shows an AFP resource search:

```
++++AFPREP
AFP,FDE=AFP.FDEFLIB
AFP,FNT=AFP.FONTLIB
AFP,FNT=SYS1.FONTLIB
AFP,OLY=AFP.OVERLIB
AFP,PGD=AFP.PDEFLIB
AFP,PSG=AFP.PSEGLIB
AFP,ALL=CTD.V610.SAMPREPS
AFP,HFS=/u/dir/resources
```

## AFP Reports

For AFP reports, you must specify the AFP FORMDEF parameter in the Report Clique.

If the report has a Resource Section with the FORMDEF of the report, the FORMDEF parameter can be left blank. The first FORMDEF in the Resource Section of the report is used.

If the report does not have a Resource Section, or some resources are missing, the resources are taken from the system libraries used by PSF as defined in the "OS390 Resource Library List" parameter in the Report Clique.

## Using ACIF to verify collected resources for AFP category 3 and 4 reports

To verify correct use of collected report resource libraries for AFP report categories 3 or 4, you can use the IBM ACIF utility (APKACIF module). For information about using the ACIF utility under Control-D Print monitor, see [Advanced ACIF Interface Facility](#) (on page 429). The current section deals with using the ACIF utility in a separate job, outside of Control-D.

For an example of using ACIF utility in a separate job, see the CTDACIF member of the IOA SAMPLE library. If the original report was written directly to CDAM, use the following example to extract a report from CDAM to a sequential data set:

```
//JOB JOB , ,MSGCLASS=X, CLASS=A
// EXEC PGM=IEBGENER
//SYSUT1 DD SUBSYS=(CDAM, 'JOBNAME=job_name, PREFIX=prefix'),
// DCB=(BLKSIZE=32760, RECFM=VBA, LRECL=32756)
//SYSIN DD DUMMY
//SYSPRINT DD SYSOUT=X, HOLD=YES
//SYSUDUMP DD SYSOUT=X
//SYSUT2 DD DSN=txt.input.report,
// DISP=(, CATLG, DELETE),
// SPACE=(TRK, (2000, 100), RLSE)
//
```

If the test report was correctly processed by the ACIF utility, but there are problems regarding resources used by the transformer, contact BMC Customer Support. Provide the following documents:

- The problematic report
- All documents indicating performed tests (used JCL, listings, and so forth)
- Resource libraries used
- Report Clique
- Member \$STRNRES

Using AFP Viewer under WebAccess, you can view reports created by the ACIF utility (submitted by a PRINT mission, when STORE=Y).

To test AFP report category 4 and related resources, you do not need to index the AFP report. So you can optionally omit the TRIGGER, FIELD, INDEX parameters.

## Xerox Reports

Xerox resources are physically located in the Xerox printer. For the transformation process to work for Xerox reports, all Xerox resources must be placed in libraries on the mainframe, using the following guidelines:

- Member names should be the same as the resource names without an extension.
- If a resource name begins with a digit, add the "\$" or "@" character at the beginning of the corresponding member name.
- All resources should be in binary format, except for the JSL resource and syscatlg, which must be in text format (EBCDIC).

Downloading Xerox Resources—To download Xerox resource files from the printer, use one of the following methods:

- Download resources from a Xerox printer to a diskette using the XEROX LPS FLOPPY command. The following resource files must be downloaded:
  - \*.frm
  - \*.lgo
  - \*.jsl
  - \*.fnt
  - \*.img
  - \*.ict

- Download resources to a cartridge using the following commands:

```
TAPE VOLINIT 6250
COPY TAPE WRITE LABEL *.JSL
COPY TAPE WRITE LABEL *.FNT
COPY TAPE WRITE LABEL *.FRM
COPY TAPE WRITE LABEL *.IMG
COPY TAPE WRITE LABEL *.LGO
COPY TAPE WRITE LABEL *.ICT
TAPE ENDFILE
END
```

Libraries—The required Xerox libraries.

Resources—For the transformation, the following font resources must always be available:

- Forms\$
- Formsx
- L0112b

In addition, the following text resources should be available:

- SYSCATLG
- ZZZRES
- PROMET

Sample resources are supplied in the IOA SAMPREPS library.

Parameters—You must specify the JSL and JDE parameters in the Report Clique.

If the JSL resource that is referenced by the report refers to a JDE/PDE that is not found in the JSL, add a line to the syscatlg resource with the JSL name that contains that JDE/PDE.

Example

```
SYSCAT
TYPE=PDE, RESNAME=PP0010, FILE=PDE001, CRDATE=1997250, CRT
IME=132200, SIZE=0, PATH=' PDE001. JSL' ;
```

In this example, the JDE/PDE name is PP0010, located in the PDE001 JSL member.

## Transforming Reports To PDF Format

When the PRINT/CDAM parameter in the decollation mission is defined as TRANSTO=(PDF,STORE) and the STORE parameter in the print mission is set to Y, the following report formats can be transformed to PDF format:



- AFP Category 3, 4, and 5 reports
- Xerox LCDS and Metacode reports
- Plain text reports

This feature has the following advantages:

- Avoids the need for on-the-fly transformation under Control-D®/WebAccess Server
- Enables retention of all AFP and Xerox resources on z/OS

The PDF transformation can be performed for regular reports and for normalized reports created by the ON TRNDSN and ON TRNCLASS decollation parameters. Control-V indexes created by decollation are adjusted for the resulting PDF file.

The transformed PDF report can be accessed by Control-D/WebAccess Server users through index navigation.

Review the following comments before defining the report transformation, which begins with [Collecting resources for transformation](#) (on page 436):

- *AFP and Xerox normalized reports* do not require steps 2, or 8, below, but may require additional resources that are used for rendering, specifically, **FONTMAP.tbl**, as described in step 1 on page 528.
- *AFP category 5 reports* require the FORMDEF parameter. If the report has a FORMDEF in the resource section it is used, and the report can be transformed without a Report Clique or TRANSTO member. In this case you should define all the AFP Resource Libraries in the \* entry in the \$\$TRNRES member. For more details see [Collecting resources for transformation](#) (on page 436).
- *Text reports* can be transformed without a Report Clique or TRANSTO member, using default parameters. If non-standard parameters (such as font name, font size, or add background image) are needed, a Report Clique or overriding parameters in the TRANSTO member can be used.
- *Xerox reports* that are not normalized are printed under Control-D with Xerox DJDE parameters (in the DJDEPARM library). These parameters are also added when Xerox reports are transformed to PDF. For more information on DJDE parameters, see [Printing Using XEROX LCDS \(DJDE\) Parameters](#) (on page 419).

The following steps describe the report transformation procedure:

- It is important to map AFP and Xerox fonts to True Type fonts so the Transformation will run faster. The mapping is done with the fontmap table specified in the Report Clique. A default FONTMAP.tbl is supplied in the IOA SMPREPS library, and it will be available to the Transformer if the following lines are included in the entry for the report in the \$\$TRNRES member:

```
AFP,ALL=IOA.SMPREPS library name
```

or

```
XRX,ALL=IOA.SMPREPS library name
```

The FONTMAP table can be created by Control-D/Desktop in Control-D/WebAccess installations and then uploaded to the IOA SMPREPS library on the mainframe, with translation to EBCDIC. There can be multiple font mapping tables for different reports, each table with a different name. Specify the name of the table in the Font Mapping Table Name parameter of the Report Clique.

## Font mapping considerations

- If a font mapping table is not found, the report will be transformed without any mapping. AFP and Xerox fonts that are not mapped, by default, are converted to Type 3 fonts and are embedded into the resulting PDF file.
- If there are many fonts and the transformed PDF has a few pages, you may use the following Report Clique parameter for reducing the size of the resulting PDF:

PDF Raster = {Text | All}

For more information see the "Font Mapping and Text Rendering" section in the Report Transformation chapter of the *Control-D/WebAccess Server Administrator Guide*.

Define Report Clique in the DO.1 screen and specify the parameters that describe the report and its resources. For more information see the Online Facilities chapter of the *Control-D and Control-V User Guide*.

In the decollation definition, define PRINT/CDAM parameters as TRANSTO=(PDF,STORE).

1. Do one of the following:
  - For AFP category 3 and category 4 reports, in the decollation definition define PRINT/CDAM parameters as ASSOC=AFP4. (AFP category 5 reports are automatically defined as ASSOC=AFP.)
  - For Xerox LCDS reports and Metacode reports, in the decollation definition define PRINT/CDAM parameters as ASSOC=XRX.
2. Define a DO PRINT statement in a decollation definition for referencing a print mission from the next step.
3. Set the print mission STORE parameter to Y.
4. Specify either MIGRATE or BACKUP fields (or both) if transformed reports in PDF format must be migrated or backed up.
5. Create a member in the TRANSTO library, assigning the jobname of the report as the member name.

## TRANSTO Library Member Syntax

Each member in the TRANSTO library should employ the following syntax:

```
++++report name mask
[ PROG=CTDRPDF]
[ CLIQUE=Report Clique name]
[ parameter name=parameter value] [; comment]
```

You can specify entries for each report name in one of the following ways:

- Specify a Report Clique name. All parameters will be taken from the Report Clique.
- Specify Report Clique parameters. All parameters that are not specified will have default values.
- Specify both a Report Clique name and Report Clique parameters.

In this case the specified parameters override corresponding parameters from the Report Clique.

The following is an example of a TRANSTO member:

```
++++report name mask
```

```
CLIQUE=name of the clique defined in the DO.1 screen
```

```
+++REP1*
```

```
Rotation=90
```

```
++++*
```

```
CLIQUE=name of the clique defined in the DO.1 screen
```

```
PDFResolution=240
```

```
FontMappingTableName=TTFONT
```

Report Clique parameters are listed in the "Common Report Clique Parameters" table in the Report Clique section of the Online Facilities chapter of the *Control-D and Control-V User Guide*.

## 1. Run the Print mission.

By default, two print missions can concurrently transform to PDF. You can increase the number of concurrently running print missions to a maximum of five by applying the WD2375 Wish.

## 2. Check that the print mission ended OK and use Control-D/WebAccess Server to view the PDF report. If the report is displayed correctly, all Report Clique parameters were correctly defined and all resources are available. If the PDF report does not look like the printed report, check one of the following options:

- Missing resources

Locate the resource library that has the missing resource, and add this library to the list of libraries in the correct entry in \$\$TRANSTO member (see step 2).

- Wrong font mapping table

The fonts of the PDF report do not look like the original fonts.

- Wrong parameters in the Report Clique

For example,

- if the report is rotated, use the Rotation=parameter
- In case of an incorrect form check the AFP FORMDEF and PAGEDEF
- for Xerox check the XEROX JSL and JDE.

When you activate trace, the Report Clique parameters used for transformation are written to the SYSPRIN DD statement in the CTDPRINT monitor.

After fixing the problems rerun the print mission until the PDF report appearance is improved.

If a report is extremely large, transformation to PDF can take a long time. In such cases, try to create a special, smaller report with the same structure and print it until it displays correctly. After the smaller report is correctly displayed you can then transform the large report.

## Activating transformer tracing for problem determination

Control-D provides an internal Transformer Trace facility that can print internal tracing records and the content of internal data areas. By default, the Transformer Trace facility is not active. This section describes how to activate the Transformer Trace facility.

Control-D provides two types of internal traces which can be used for problem determination:

- TRACE 30, which prints resource access messages. Use the following command to activate this trace:  
F CONTROLD,TRACE=30
- The Internal Transformer Trace facility, which prints internal tracing records and the content of internal data areas. By default, the Transformer Trace facility is not active.

Activate transformer tracing only when directed to do so by BMC Customer Support.

### ➤ To activate transformer tracing for problem determination

Change the content of member TRANSTRC in CTD PARM library to the following:

```
; %nodebug
%line_length 100
* 100
```

where

; as the first character in a line defines the line as a comment

%nodebug in the first line (were it not commented out) specifies skipping the entire member

%line\_length 100 specifies a printing line length of 100 bytes

\* 100 switches on all debug printings from all source modules

## Approving reports

The Report Approval feature enables the implementation of an approval and workflow process for reports in the Control-D repository. Administrators can assign reports for approval to a group of 1 or more users, defined by a unique Approval name in the Approval tree. A report assigned to an Approval name, can be approved by any user defined in the Approval name, as long as that specific user has permission to view that report.

- For more information on approving reports, see the *Control-D/WebAccess Server User Guide*.
- For information on granting permissions to users to view reports, see the "Control-D and Control-V Basic Definition Security Calls" section in the *INCONTROL for z/OS Security Guide* and the "Defining the Recipient Tree" section in the "Implementation Hints" chapter in the *Control-D and Control-V User Guide*.

The Report Approval feature is beneficial in:

- Preventing reports from being published before approval
- Facilitating a workflow process

## Preventing reports from being published before approval

Reports that have not yet been approved can be prevented from being viewed and printed by users other than those defined in the Approval name.

To prevent reports from being viewed before approval

Define the Approval name as follows:

1. Identify the list of Control-D/WebAccess Server users that should approve the specific report.
2. Define these usernames or masks in the AUTHORIZE field in the Approval name in the IOA Approval tree.
3. Determine who to send emails to, if the report has not been approved on time, by defining the EMAIL and EMAILCC parameters in the DESC field of the Approval name.

The Approval tree is comprised of a hierarchy of Approval names. Each Approval name can view and approve reports of Approval names situated below. For more information, see the section on Defining the Approval tree in the *Control-D and Control-V User Guide*.

4. Assign a report for approval by adding a DO APPROV statement in the decollation definition with the following specifications:
  - the Approval name
  - the value of Hidden as Y
  - the number of days in the SLA parameter - if this report must be approved within a certain number of days after it has been created

Users can also approve one report, and grant approval to all other reports related to the same \$SYSDATA. For this option, specify the value of Multi as S. If the Hidden value is Y, all reports related to the same \$SYSDATA, are also hidden.

If the report for approval, is created as a result of a STORE = Y print mission, specify the value of STORE as Y.

|      |        |               |         |               |       |       |       |    |        |
|------|--------|---------------|---------|---------------|-------|-------|-------|----|--------|
| DO   |        |               |         |               |       |       |       |    |        |
| WHEN | LINE   | 00020 - 00060 | COL     | 00020 - 00024 | PRINT | REF   | NXT   | CT | AND/OR |
|      | STRING | =             | TOTAL   |               |       |       |       |    |        |
| DO   | APPROV | =             | FINANCE | HIDDEN        | Y     | MULTI | STORE | N  | SLA 5  |
| DO   |        |               |         |               |       |       |       |    |        |

For more information on DO APPROV, see the section on Decollation Mission Parameters in the Control-D and Control-V User Guide.

It is also possible to add approval attributes, using the User Permanent file. For more information, see the section on Permanent User Report List File in the *INCONTROL for z/OS Administrator Guide*.

During the decollation process, an Approval Object is created for each report with a valid approval definition. The Approval name is checked against the Approval tree and if there is a match, the Approval Object is created. The SLA (Service Level Agreement) for the report is then added to the Approval Object. Once the report is either approved or rejected the Approval Object is deleted. Approval Objects can be viewed in the DO.5 screen. For more information, see the *Control-D and Control-V User Guide*.

Each user must filter for the reports that are assigned to them for approval using the Control-D/WebAccess Server. For more information, see the section on filtering for reports that need approval, in the *Control-D/WebAccess User Guide*.

5. Run the CTDAPRV utility, as needed, in order to:

- check whether reports are being approved on time
- send emails to users that still need to approve reports
- force approve or reject reports that cannot be approved by Control-D/WebAccess Server users

For more information, see the *INCONTROL for z/OS Utilities Guide*.

Administrators can only view reports in Control-D/WebAccess Server, if they are included as a user in the Approval name and have been granted permissions to view that specific report. Otherwise, use the CTDAAPRV utility. For more information on the CTDAAPRV utility, see the *INCONTROL for z/OS Utilities Guide*.

You can select whether to print reports waiting for approval and those in select approval statuses. By implementing the optional wish WDN028, reports are printed only after approval. By default, reports are printed regardless of their approval status.

Migration and backup of reports run without checking the approval status of reports.

Copying or the GIVETO command does not copy the approval status of reports.

CTDDELRP utility has special parameters for managing reports in the approval process. For more information, see the *INCONTROL for z/OS Utilities Guide*.

## Facilitating a workflow process

You can facilitate the report approval workflow process by adding reports to the approval process from the Control-D/WebAccess Server. Adding reports for approval allows you to move the report from one Approval name to another that is required to review and approve the report. This is done throughout the workflow until the report has reached the final approval stage.

### ➤ To facilitate the workflow process

1. Define the Approval name as described in [Preventing reports from being published before approval](#) (on page 444).
2. Add a report for approval by the next Approval name using the Control-D/WebAccess Server. For more information, see the section on Adding a report for approval in the *Control-D/WebAccess Server User Guide*.

## Control-D/Page On Demand

Control-D/Page On Demand is a separately licensed add-on feature for Control-D, Control-V and Control-D/WebAccess Server.

The Control-D/Page On Demand client or server feature enables Control-D/WebAccess Server users to view reports that reside on mainframe storage in real-time. Control-D/Page On Demand is provided by Control-D, Control-V, and Control-D/WebAccess Server as an alternative to the batch download method.

Control-D/Page On Demand eliminates the need to distribute large production reports over the network to all potential online viewing users. The reports remain centrally stored and users retrieve only the pages they require. Reports can be retrieved from the Control-D Active User file, the Control-V Migrated User file, or both. Indexed reports can be retrieved by index name and value.

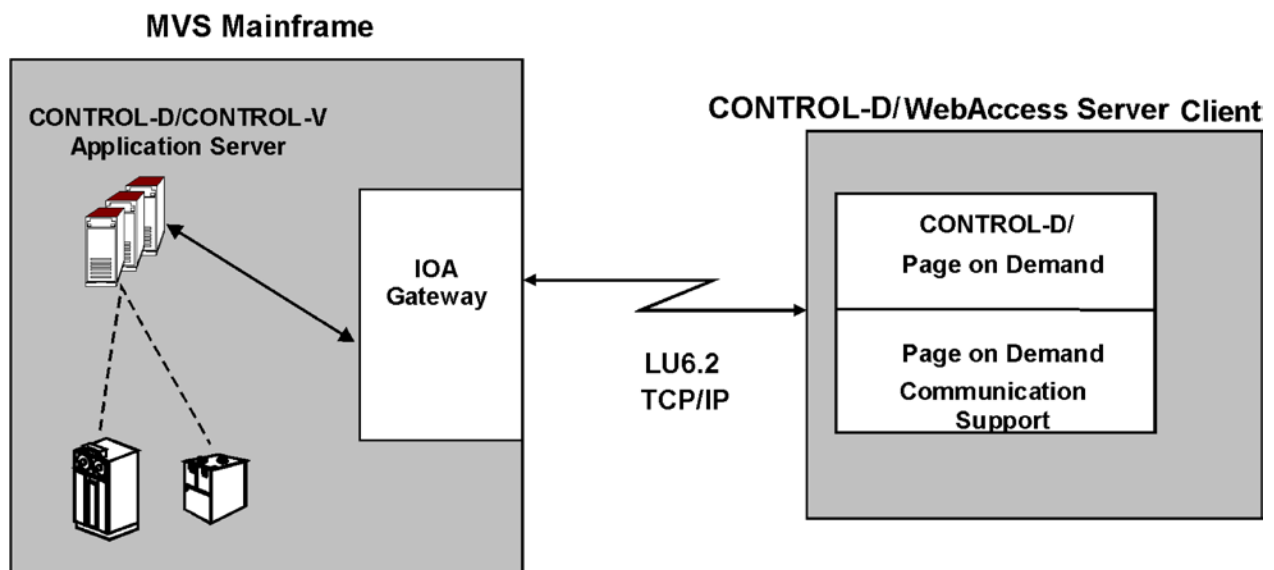
The Control-D/Page On Demand feature enables you to

- retrieve and view AFPDS reports
- transform AFP reports to PDF format
- view PostScript output created by DOC1 or CompuSet products
- sort the report list
- use Control-D/WebAccess Server to retrieve all other types of reports, and view them with the appropriate viewer

## Control-D/Page On Demand Components

Control-D/WebAccess Server acts as a client component that communicates with the Control-D Application Server. The Control-D/WebAccess Server client and the Control-D Application Server communicate over SNA and TCP/IP networks.

The following figure illustrates how Control-D/Page On Demand is processed using the Control-D Application Server on the mainframe and Control-D/WebAccess Server as the client or a workstation:



The workflow under Control-D/Page On Demand is as follows:

- A user who needs to view centrally archived reports logs in to Control-D/WebAccess Server.
- The user is presented a list of reports that were downloaded in batch format according to predefined criteria.
- The user can sort the list of reports, as described in Optional Wish WD3368, in the IOADFLTS member of the IOA DOC library.
- The user requests report retrieval from the central repository (that is, in the mainframe under Control-D or Control-V).

A communication process is established (through SNA using APPC or through TCP/IP protocol) in the background between the PC and the MVS mainframe.

Logon to the mainframe is enabled using the Mainframe Logon User ID and MF password fields in the Communication Setup dialog box in Control-D/WebAccess Server.

User Exit IOAX016 and security module IOASE16 are provided to control access to the mainframe through the IOA Gateway. For more information, see the *INCONTROL for z/OS Security Guide*, and Chapter 9, "Exits."

Once logon to the mainframe is established, the Control-D Application Server processes all the requests of the Control-D/WebAccess Server client.

- The user specifies selection criteria for the mainframe reports. Reports can be retrieved from the Control-D Active User file, the Control-V Migrated User file, or both. Indexed reports can be retrieved by index name and value.
- An additional communication process is initialized between the PC and the mainframe.

User Exit CTDX024 and security module CTDSE24 are provided to control access to Control-D and Control-V mainframe reports. For more information, see Chapter 9, "Exits," and the *INCONTROL for z/OS Security Guide*.

- In Control-D/WebAccess Server, the list of reports based on the selection criteria are listed in the Report list. These criteria can be modified as required using the standard Control-D/WebAccess Server filter.
- The list of reports can be sorted, as described in Optional Wish WD3368, in the IOADFLTS member of the IOA DOC library.

The user then selects the required reports for viewing.

The retrieval request is transferred from Control-D/WebAccess Server to the Control-D Application Server on the mainframe. The Control-D Application Server retrieves the report pages and transfers them to Control-D/WebAccess Server for further processing. On the Control-D/WebAccess Server client or workstation, Control-D/Page On Demand uses a caching mechanism whereby pages that have already been retrieved do not need to be retrieved again from the mainframe.

- The Notification facility enables the user to create and update notes and annotations to Control-D and Control-V reports. These notes are kept on the mainframe and are accessible through the Control-D and Control-V Online Interface and through Control-D/WebAccess Server using Control-D/Page On Demand.



- Any report can be retrieved and viewed using Control-D/WebAccess Server.

For details about using this feature, see the documentation for Control-D/WebAccess Server for Windows, version 3.21 or later.

## Using the Work Load Manager (WLM) to manage response time of IOA Application Server

Response time for Control-D/WebAccess users is very important, and becomes critical at the sites where many users are working simultaneously and if the workload changes throughout the production day.

This option introduces a way to manage response time according to the customer's requirements, by providing an interface in the IOA Application Server (IOAAS) to the Work Load Manager (WLM).

A special table in the WLM contains definitions of transaction types, which the IOASS uses to register every critical transaction in the WLM. According to this registration, the WLM can analyze average response time, and can automatically change priorities on the IOASS as required.

### CTDASWLM table

To have the WLM manage the response time, configure the CTDASWLM member in CTDPARM library.

This table is used by the Control-D Application Server to enable WLM support. It determines which IOAAS requests should be handled by the Work Load Manager, and how these requests are associated with the transaction names defined in the WLM.

### CTDASWLM format

The CTDASWLM table consists of two parts:

- The first part defines common values.
- The second part defines transaction names defined by a customer in the WLM separately for each type of IOAAS request. All parameters are located in fixed columns.

```
*-- +--- 1--- +--- 2--- +--- 3--- +--- 4--- +--- 5--- +--- 6--- +--- *
```

|                      |      |         |
|----------------------|------|---------|
| WLM_ENABLE=Y         |      |         |
| SYSNAME=type         |      |         |
| SUBSYSNAME=i oaaswlm |      |         |
| *-----               |      |         |
| * TRX_NAME           | REQ# | COMMENT |
| *-----               |      |         |
| TRX_NAMX             | XX   | COMMENT |
| TRX_NMEY             | YY   | COMMENT |
| TRX_NMEZ             | ZZ   | COMMENT |
| *-----               |      |         |

Each of the parameters should be defined on a separate line and start in column 3. The following table lists the parameters used to configure the CTDASWLM member:

**Table 150 CTDASWLM Parameters**

| Parameter  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WLM_ENABLE | <p>Enables WLM support on the Control-D Application Server.</p> <ul style="list-style-type: none"> <li>Y (Yes) - WLM support is provided.</li> <li>N (No) - WLM support is not provided. Default.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                    |
| SYSNAME    | Generic subsystem type that is defined in the WLM. Length: up to 4 characters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| SUBSYSNAME | <p>Subsystem name that is defined in the WLM. Length: up to 8 characters.</p> <p>The WLM_ENABLE, SYSNAME, and SUBSYSNAME parameters should each be defined on a separate line and start in column 3.</p>                                                                                                                                                                                                                                                                                                                                                                        |
| TRX_NAME   | Qualifier Name in the Transaction Name Group defined in the WLM, beginning in column 3. Length: up to 8 characters.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| REQ#       | <p>IOA Application Server request number. Length: 2 characters. Start in column 15. Valid values are:</p> <ul style="list-style-type: none"> <li>03 – report list</li> <li>04 – view report</li> <li>05 – object database request</li> <li>06 – host print request</li> <li>07 – notes request</li> <li>08 – index request</li> <li>09 – update request</li> <li>10 – global index request</li> <li>12 – get tree request</li> <li>14 – doc management request</li> <li>15 – report attributes list</li> <li>16 – extended report list</li> <li>17 – extended update</li> </ul> |
| COMMENTS   | <p>Appears in columns 20 through 72.</p> <p>Each transaction name and request should be specified on a separate line.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Reloading CTDASWLM

The CTDASWLM member is automatically loaded when the IOA Application Server starts, and can be reloaded by the following operator command:

**F IOAGATE,MODASID=*nn* MODAPPL D LOADWLMP**

where *nn* is the decimal sequential ASID number of the Control-D Application Server address space to which the MODIFY command is submitted. The MODIFY command is broadcast to all active Application Server address spaces if the ASID number '*nn*' is omitted.

## Work Load Manager (WLM) definitions

The following items should be defined in the Work Load Manager:

- Service Class – determines a response time goal. A customer can define separate Service Classes for different IOAAS request types, or use one Service Class for several IOAAS request types.
- Classification Rules – enables the WLM to link the transaction name with the Service Class.
- Transaction Name Group – contains Qualifier Name used by the Control-D Application Server to connect to the WLM.

## Control-D Application Server workload

If a customer defines WLM\_ENABLE=Y, the Control-D Application Server connects with the WLM using SYSNAME and SUBSYSNAME during startup. Subsequently, for every IOAAS request that is defined in the CTDASWLM table, the Control-D Application Server passes a message to the WLM with information about the beginning and end times of the transaction.

Each message sent by the IOAAS to the WLM includes a Qualifier Name. The WLM checks if this Qualifier Name exists in any Transaction Name Group, which is used by WLM to determine the corresponding Service Class.

If the current IOAAS request (Qualifier Name) is not defined in any Transaction Name Group, the default Service Class from the generic subsystem type definition is used.

The WLM can change the priority of the corresponding Service Class goal in the IOA Application Server, to provide the required response time.

## Example of the CTDASWLM table

```

*-----1-----2-----3-----4-----5-----6-----*
WLM_ENABLE=Y
SYSNAME=CDAS
SUBSYSNAME=CTDASWLM
*-----
* TRX_NAME      REQ#  COMMENT
*-----
  REPLIST       03    REPORT LIST
  REPORT        04    VIEW REPORT
* NOTE         07    NOTES REQUEST - is not used, commented
  INDEX         08    INDEX REQUEST
* GLOBALIX     10    GLOBAL INDEX REQUEST
* TREE         12    GET TREE REQUEST - is not used, commented
  REPLIST       16    EXT REPORT LIST - the same Trans name as request #3

```

## Example of corresponding WLM definitions

## Service Classes

```
* Service Class ASWLMDF - Dflt Service Class for AS (630)
```

```
Base goal:
```

```
CPU Critical flag: NO
```

| # | Duration | Imp | Goal description         |
|---|----------|-----|--------------------------|
| 1 | 100      | 2   | Execution velocity of 50 |
| 2 |          | 4   | Execution velocity of 10 |

```
* Service Class ASWLMRL - Service Class for AS Report List
```

```
Base goal:
```

```
CPU Critical flag: NO
```

| # | Duration | Imp | Goal description                 |
|---|----------|-----|----------------------------------|
| 1 |          | 2   | 95% complete within 00:00:00.050 |

```
* Service Class ASWLMVI - Serv. Class for AS Index request
```

```
Base goal:
```

```
CPU Critical flag: NO
```

| # | Duration | Imp | Goal description                 |
|---|----------|-----|----------------------------------|
| 1 |          | 3   | 90% complete within 00:00:00.200 |

```
* Service Class ASWLMVR - Service Class for AS View Report
```

```
Base goal:
```

```
CPU Critical flag: NO
```

| # | Duration | Imp | Goal description                 |
|---|----------|-----|----------------------------------|
| 1 |          | 3   | 70% complete within 00:00:02.000 |

**Classification Rules****\* Subsystem Type CDAS - AS WLM Rule****Classification:**

Default service class is ASWLMDF  
There is no default report class.

| Qualifier<br># type | Qualifier<br>name | Starting<br>position | Service<br>Class | Report<br>Class |
|---------------------|-------------------|----------------------|------------------|-----------------|
| 1 SI                | CTDAS*            |                      |                  |                 |
| 2 . TNG             | . REP_LIST        |                      | ASWLMRL          | CONTROLD        |
| 2 . TNG             | . VIEW_INX        |                      | ASWLMVI          | CONTROLD        |
| 2 . TNG             | . VIEW_REP        |                      | ASWLMVR          | CONTROLD        |

**Descriptions:**

| Qualifier<br># type | Qualifier<br>name | Description |
|---------------------|-------------------|-------------|
| 1 SI                | CTDAS*            |             |
| 2 . TNG             | . REP_LIST        |             |
| 2 . TNG             | . VIEW_INX        |             |
| 2 . TNG             | . VIEW_REP        |             |

**Descriptions:**

| Qualifier<br># type | Qualifier<br>name | Storage<br>Critical | Manage Region<br>Using Goals Of |
|---------------------|-------------------|---------------------|---------------------------------|
| 1 SI                | CTDAS*            | NO                  | TRANSACTION                     |
| 2 . TNG             | . REP_LIST        | NO                  | TRANSACTION                     |
| 2 . TNG             | . VIEW_INX        | NO                  | TRANSACTION                     |
| 2 . TNG             | . VIEW_REP        | NO                  | TRANSACTION                     |

**Transaction Name Groups****\* Transaction Name Group AS\_START -**

| Qualifier<br>name | Description  |
|-------------------|--------------|
| %63AS             | AS 630 start |
| %63AS%            | AS 630 start |

**\* Transaction Name Group REP\_LIST -**

| Qualifier<br>name | Description    |
|-------------------|----------------|
| REPLIST           | AS report list |

**\* Transaction Name Group VIEW\_INX -**

| Qualifier<br>name | Description      |
|-------------------|------------------|
| VIEWINX           | AS index request |

**\* Transaction Name Group VIEW\_REP -**

| Qualifier<br>name | Description       |
|-------------------|-------------------|
| VIEWREP           | AS report viewing |

## Viewing AFP Reports Under Control-D/Page On Demand

Desired portions of reports in AFPDS format can be viewed and printed through Control-D/WebAccess Server with the AFP Viewer or CompuView Navigator. Such reports must be stored under Control-D and Control-V with their original Print Resources. By using Control-V indexes for AFP reports, selected pages can be downloaded to the client. The following topics describe the preparations needed for viewing AFP reports under Control-D/WebAccess Server.

### Preparation for AFP Reports

For an AFP report to be viewed through Control-D/Page On Demand, its report decollating mission definition must include one of the PRINT/CDAM PARM values described in the table below.

Parameter=Value Explanation

**Table 151 Mandatory PRINT/CDAM PARM Values for Report Decollating Mission Definition for AFP Reports**

| Value    | Description                                                                                                                                                                                                                                                                                                                                 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| APA=YES  | Specify this parameter if the original report is already transformed to AFPDS format. If the report does not contain ACIF index information, it is recommended that Control-V indexes be specified in the decollation mission based on the report data.<br><br>Optional Wish WD2949 must have APPLY set to NO (default).                    |
| ACIF=YES | Specify this parameter if the ACIF utility is called to transform original reports to AFPDS format. It is recommended that Control-V indexes be specified in the decollation mission according to the report data or that ACIF indexes be specified in the Control-D ACIFPARM library. This enables direct access to specific report pages. |

### Parameter STORE of Printing Mission Definition

Parameter STORE in the printing mission definition must be set to Y (Yes) to store the AFPDS report on the mainframe. In this case, a new report is created and its print image is stored in a new CDAM file. New SYSDATA and User entry records are created in the Active User file pointing to this new CDAM file. The new CDAM file is allocated according to PC installation parameters PCBLKSZ, PCPREF, PCUNIT and PCVOLS. For more information about parameter STORE, see the chapter about printing missions in the *Control-D and Control-V User Guide*.

If ACIF indexes were specified for these reports and Control-V is installed, then corresponding Control-V indexes are created during printing mission processing. By default, every ACIF index is transformed to a Control-V main index. To create Control-V subindexes, see the CTVINDEXnn parameter in [ACIFPARM Library](#) (on page 433).

## Viewing PostScript Reports

For a PostScript report to be viewed through Control-D/Page On Demand, its report decollation mission definition must include one of the PRINT/CDAM PARM values described in the following table:

**Table 152 Mandatory PRINT/CDAM PARM Values for Report Decollating Mission Definition for PostScript Reports**

| Value   | Description                                                                      |
|---------|----------------------------------------------------------------------------------|
| PS=DOC1 | Specify this parameter if the Postscript report is created by DOC1.              |
| PS=CSET | Specify this parameter if the Postscript report is created by CompuSet products. |

## Update EBCDIC – ASCII Translation Tables

When Postscript reports are transferred from the mainframe they are translated from EBCDIC to ASCII

Member TRNE2A in the IOA PARM library is the default translation table that is used for the translation between EBCDIC and ASCII. If your site uses a non-standard EBCDIC and/or ASCII character set, update this table accordingly.

## Viewing All Other Types of Reports

Reports other than AFP and PostScript can be viewed with Control-D/Page On Demand according to the CDAM ASSOC parameter, provided that the appropriate viewing utility is installed.

For more information on the ASSOC parameter, see the CDAM chapter in the *Control-D and Control-V User Guide*.

## Starting Control-D/Page On Demand on the Mainframe

Verify that the IOA Gateway has been successfully installed before trying to start Control-D/Page On Demand. For information about installing the IOA Gateway, see the IOA chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

To start Control-D/Page On Demand processing, first initialize the mainframe components. Control-D/WebAccess Server users can then proceed to use Control-D/Page On Demand.

Activate the IOA Gateway using following operator command:

```
S IOAGATE
```

It is possible to override ECAPARM communication parameters (APPLIDS, PORT) with parameters specified in the EXEC PARM of IOAGATE. For information about ECAPARM parameters, see the *INCONTROL for z/OS Installation Guide: Installing*.

---

**S IOAGATE,PORT=2525'**


---

The Control-D Application Server (called IOAAS) is automatically activated by the IOA Gateway.

- To deactivate the IOA Gateway, specify operator command

P IOAGATE

This deactivates the Control-D Application Server (IOAAS) as well.

- To activate Control-D/WebAccess Server, see the *Control-D/WebAccess Server User Guide*.

## Displaying a List of All Active Users

To display the list of all active users in the Application Server, specify operator command

---

**F IOAGATE,MODASID[=nn] [DI SPLAY]**


---

where nn is the specific address space ID of the server to which the modify command is submitted.

If no address space is specified, the modify command is submitted to all the active server address spaces.

When D[ISPLAY] is specified, a list of all active sessions are displayed.

## Displaying Active Application Server Address Spaces

The F IOAGATE,STATUS operator command can be issued in the IOAGATE address space at any time to display all the active Control-D Application Server address spaces and their ASID numbers. For more information about this operator command, see [IOAGATE](#) (on page 711).

For information about activating the IOA Gateway, see [Starting Control-D/Page On Demand on the Mainframe](#) (on page 455).

## Stopping and restarting statistics collection in IOAAS

Normally Application Server statistics are continuously collected in the background. If for some reason the statistics collection must be stopped and afterwards started, use the following commands:

- F IOAGATE,MODASID STATTERM  
which is used to stop gathering statistics
- F IOAGATE,MODASID STATINIT  
which is used to begin gathering statistics

When the F IOAGATE,MODASID STATINIT command is issued the second time, it zeros out the counters.

## Adjusting the scope of the performance trace in IOAAS

Performance trace levels for IOAAS are provided with levels 10 and 12 (see [Problem Determination](#) (on page 458)). However since these trace levels reflect every request processed by IOAAS, performance analysis by development and support can be difficult because of the large size of the trace output.



To facilitate performance analysis, the following MODIFY command can be used to restrict the scope of the 10 and 12 performance traces to include only specific types of requests or only the actions of a specific user.

To adjust the scope of the performance traces, specify the command

```
F IOAGATE,MODASID [ioass_id] SHARPTRC  
{ REQ={LIST|REPORT|SESS|ALL} | USER=login_id/SHOW/DROP}
```

where

- *ioass\_id* is the ASID number of the Control-D Application Server address space to which the MODIFY command is submitted
- *login\_id* is the user ID

**Table 153 Trace scope parameters**

| Parameter | Description                                                                                                                                                                                                                                                                                                                             |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REQ       | Specifies the trace for one of the following request groups: <ul style="list-style-type: none"> <li>▪ LIST – for the requests dealing with the report list</li> <li>▪ REPORT – for the requests dealing with a specific report</li> <li>▪ SESS – for the requests related to whole session</li> <li>▪ ALL – for all requests</li> </ul> |
| USER      | Limits trace for only the specified user.                                                                                                                                                                                                                                                                                               |
| SHOW      | Requests printing the existing trace limitation settings.                                                                                                                                                                                                                                                                               |
| DROP      | Cancels trace limitation.                                                                                                                                                                                                                                                                                                               |

## Reloading the Recipient Tree

For information on this topic, see [Loading the Recipient and Approval Tree](#) (on page 372).

## Using the zIIP processor by the Control-D Application Server

The ZIIPXBMA parameter is provided in the IOAPARM member for offloading Control-D Application Server and Control-D File Transfer option (FTO) I/O workloads to zIIP with XBM (Extended Buffer Manager). The default is Y, that the I/O workloads are offloaded to zIIP with XBM.

The XBM modify command allows the Control-D Application Server to activate the offloading of eligible I/O workloads from general purpose processors to zIIP processors with XBM. This way XBM address space can be started after INCONTROL address spaces, without requiring the INCONTROL address spaces to be restarted.

For the Control-D Application Server, the XBM modify operator command syntax is as follows:

---

**F IOAGATE, MODASID=*nn* MODAPPL D XBM**


---

where *nn* is the decimal sequential ASID number of the Control-D Application Server address space to which the modify command is submitted. The modify command is broadcast to all active Application Server address spaces if the ASID number '*nn*' is omitted.

## Problem Determination

To enable or disable trace messages, specify the command

---

**F IOAASD*mm*, TRACE=(*nn*[ , - *nn*] . . . )**


---

where

- *mm* is the decimal sequential ASID number of the Control-D Application Server address space to which the TRACE command is submitted
- *nn* enables and -*nn* disables trace message *nn* in the following table:

**Table 153      Debug Action Values**

| <i>nn</i> Value | Debug Action                     |
|-----------------|----------------------------------|
| 10              | Input and output request buffers |
| 11              | Mailbox messages                 |
| 12              | Application program calls        |
| 17,18,19        | Online viewing messages          |
| 20,21,22        | CDAM interface messages          |
| 23              | Report list messages             |
| 32              | Mailbox internal trace           |
| 33              | WLM interface internal trace     |

## Control-D File Transfer Option

Control-D File Transfer option (FTO) lets you transfer files from Control-D Session Agent (SesAgent) to MVS. The transferred files are saved in the spool or in CDAM for further decollation by Control-D.

FTO works in the IOAAS address space. For details about configuring IOAGATE and the IOAAS address space, see the ICE installation procedure in the IOA chapter, and the IOAGATE section in the *INCONTROL for z/OS Installation Guide: Installing*.

Each newly transferred file is processed by FTO according to special transfer, allocation, scheduling and post-processing parameters. These parameters are located in the Control-D FTOPARM library.

## Transferring a File in SesAgent

In SesAgent, specify the output dataset name using the destination file name (-d) argument described in the following table:

```
GROUP_ID/REPORT_ID[/JOBNAME/JOBID/ ]
```

**Table 154 Destination File Name Parameters**

| Parameter        | Description                                                                                                 |
|------------------|-------------------------------------------------------------------------------------------------------------|
| <i>GROUP_ID</i>  | ID of the group for the output dataset. Can be a maximum of eight bytes. Mandatory.                         |
| <i>REPORT_ID</i> | ID of the report of the output dataset. Can be a maximum of 50 bytes. Optional.                             |
| <i>JOBID</i>     | ID of the job of the output dataset. Can be a maximum of five bytes, and can only contain digits. Optional. |
| <i>JOBNAME</i>   | Name of the job of the output dataset. Can be a maximum of eight bytes. Optional.                           |

## Specifying File Transfer Settings

Each newly transferred file is processed by FTO according to special transfer, allocation, scheduling and post-processing parameters. These parameters are located in the Control-D FTOPARM library.

Members of the Control-D FTOPARM library are selected according to matching GROUP\_IDs. Special member \$\$FTDFLT in the Control-D FTOPARM library specifies the default parameters.

Members in the Control-D FTOPARM library are formatted as follows:

```
++++REPORT_ID
PARAMETER1=VALUE1,
PARAMETER2=VALUE2,
.....
.....
.....
PARAMETERn=VALUEn
```

Mask characters (wildcards) can be specified for ++++REPORT\_ID.

PARAMETER*n* can be defined according to the parameters described in the following table.

**Table 155      Transfer Parameters**

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TYPE      | <p>The type of transfer that must occur. If parameter TYPE is not specified, its value is taken from the header provided by SesAgent. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ A (or ASCII) - ASCII transfer.</li> <li>▪ B (or Binary) - Binary transfer.</li> <li>▪ AFP - AFP transfer (that is AFPDS report Category 5), which is stored on the mainframe with a record format (RECFM) of VBA, a logical record length (LRECL) or 32756 and a block size (BLKSIZE) of 32760.</li> <li>▪ N (or NORM) - This parameter is used together with the REPENTRY parameter causing the report to be transferred in binary mode and be marked as normalized (like a report created on the mainframe by a decollation mission with an ON TRNCLASS/ON TRNDSN statement). This parameter is required to enable printing of normalized XEROX reports.</li> </ul> |
| TRANSTB   | <p>Name of the translation table from ASCII to EBCDIC.</p> <ul style="list-style-type: none"> <li>▪ STD - Standard table TRNA2E located in the IOA PARM library. Default.</li> <li>▪ &lt;table name&gt; - Any other table, explicitly named.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| LINESEP   | <p>Line separator.</p> <ul style="list-style-type: none"> <li>▪ CRLF - Carriage return and line feed. Default.</li> <li>▪ LF - Line feed.</li> <li>▪ NONE - No line separator.</li> <li>▪ RDW - Causes line separation according to RDW at the beginning of every line.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| PAGESEP   | <p>Page separator.</p> <p>IOA Exit 39 can be used to force page break according to non-standard control characters during writing to CDAM. For descriptions of all exits, see Chapter 9, "Exits."</p> <ul style="list-style-type: none"> <li>▪ FF - Form feed.</li> <li>▪ NONE - No page separator. Default</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| OUT       | <p>Output target, where the transferred files reside.</p> <ul style="list-style-type: none"> <li>▪ SPOOL - Transferred files reside in the spool. Default.</li> <li>▪ CDAM - Transferred files reside in CDAM.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FIRSTLINE | <p>Indication of whether a new first line must be inserted before the beginning of the report, and if so, what the contents of the new first line must be.</p> <p>AutoEdit variables %GROUP%, %REPORT%, %REPORTX%, %DATE%, %TIME%, %JOBNAME%, and/or %JOBID% can be specified in this parameter.</p> <ul style="list-style-type: none"> <li>▪ AUTO - A first line is inserted the report in one of the following formats: <ul style="list-style-type: none"> <li>▪ for Control-D working in IOA610 backward compatibility mode</li> <li>▪ USER=%GROUP% REPORT=%REPORT% JOBNAME=%JOBNAME% JOBID=%JOBID%</li> <li>▪ for Control-D working in regular mode</li> <li>▪ USER=%GROUP REP=%REPORTX% JOB=%JOBNAME%</li> </ul> </li> <li>▪ 'image' - An image of the first line to be inserted before the report.</li> <li>▪ NONE - No first line is inserted before the report.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| REENTRY   | <p>The REENTRY parameters requests the creation of new USER and SYSDATA records for the entire dataset stored in a CDAM without decollation. This parameter can be specified only if CDAM is specified in the OUT parameter.</p> <p>The SYSDATA and USER records are created as defined in the REENTRY parameter's subparameters. Additional relevant information is also obtained from CDAM and is inserted into the SYSDATA record.</p> <p>Values for REENTRY subparameters must be specified between single quotes. AutoEdit variables %GROUP%, %REPORT%, %REPORTX%, %DATE%, %TIME%, %JOBNAME%, and/or %JOBID% can be specified in these subparameters. The REENTRY subparameters are:</p> <ul style="list-style-type: none"> <li>▪ USER - User name. Mandatory.</li> <li>▪ NAME - Report name. Mandatory.</li> <li>▪ PRINT - Print mission name. Optional.</li> <li>▪ MIGRATE - Migration mission name. Optional.</li> <li>▪ BACKUP - Backup mission name. Optional.</li> <li>▪ REMARK - Comments. Optional.</li> <li>▪ REMARK2 -Extended comments. Optional.</li> <li>▪ REMARK3 - Extended comments. Optional.</li> <li>▪ CATEGORY -Category field in the USER record, up 20 chars in length. Optional. CREATED is a default value.</li> <li>▪ ODAT - ODAT stored in VSA USER and SYSDATA record. Optional.</li> </ul> |

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STAT      | <p>The STAT parameter determines whether Control-D File Transfer option issues messages to the IOA Log every time file transfer starts and terminates. This parameter can only be defined in member \$\$FTDFLT, the defaults member.</p> <ul style="list-style-type: none"> <li>▪ YES - The product issue messages to the IOA Log every time file transfer starts and terminates. Default.</li> <li>▪ NO - The product does not issue messages to the IOA Log when file transfer starts and terminates.</li> </ul> |
| SMF       | Number of SMF records that can be created upon termination of each file transfer. Control-D Exit 27 can be used to create SMF records.                                                                                                                                                                                                                                                                                                                                                                             |
| DESC      | Can be used in Control-D user exit 27. Up to 75 chars in length.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 156 Post-processing Parameters**

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DECMIS    | <p>Decollation scheduling parameters. This parameter has the following format:</p> <pre><i>date libname [missionname catname] [FORCE]</i></pre> <p>For more information, see <a href="#">Scheduling Missions Through a New Day Procedure</a> (on page 386).</p>                                                                                                                                                                     |
| WTO       | <p>Text of message.</p> <ul style="list-style-type: none"> <li>▪ 'message' - AutoEdit variables %GROUP%, %REPORT%, %REPORTX%, %DATE%, %TIME%, %JOBNAME%, and/or %JOBID% can be specified.</li> <li>▪ WHEN - Optional. Valid values: OK, NOT OK, ALWAYS. Default: OK.</li> </ul>                                                                                                                                                     |
| COND      | <p>Prerequisite condition to add to or delete from the IOA Conditions file. The condition is specified in the format:</p> <pre><i>action COND condition condition-date</i></pre> <p>For more information, see the IOA Utilities chapter in the <i>INCONTROL for z/OS Utilities Guide</i>.</p> <p>AutoEdit variables %GROUP%, %REPORT%, %REPORTX%, %DATE%, %TIME%, %JOBNAME%, and/or %JOBID% can be specified in this parameter.</p> |

Any post-processing parameter can be specified several times. If a file is not transferred successfully, the only post-processing action that is performed is that specified parameter WTO with subparameter WHEN set to NOT OK or ALWAYS. In this case, the resulting file is deleted.

## Printing and Allocation Parameters

The following table describes Printing and Allocation Parameters:

**Table 157     Printing and Allocation Parameters**

| Parameter | Description                                                                                                                                                |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EXTWTR    | For a description of parameter OVERRIDE, see the printing missions chapter in the <i>Control-D and Control-V User Guide</i> .                              |
| DEST      | For a description of parameter OVERRIDE, see the printing missions and CDAM chapters in the <i>Control-D and Control-V User Guide</i> .                    |
| FORMS     | For a description of parameter OVERRIDE, see the printing missions and CDAM chapters in the <i>Control-D and Control-V User Guide</i> .                    |
| CLASS     | For a description of parameter OVERRIDE, see the printing missions chapter in the <i>Control-D and Control-V User Guide</i> . The default CLASS is A.      |
| COPIES    | For a description of parameter OVERRIDE, see the CDAM chapter in the <i>Control-D and Control-V User Guide</i> . The default is 1.                         |
| RECFM     | For information about printing parameters see the online facilities chapter in the <i>Control-D and Control-V User Guide</i> . The default value is VBA.   |
| LRECL     | For information about printing parameters see the online facilities chapter in the <i>Control-D and Control-V User Guide</i> . The default value is 32756. |
| BLKSIZE   | For information about printing parameters see the online facilities chapter in the <i>Control-D and Control-V User Guide</i> . The default value is 32760. |
| FCB       | For information about printing parameters see the online facilities and CDAM chapters in the <i>Control-D and Control-V User Guide</i> .                   |
| CHARS     | For information about printing parameters see the online facilities and CDAM chapters in the <i>Control-D and Control-V User Guide</i> .                   |

The following table describes the parameters that can only be specified if parameter OUT is set to CDAM.

**Table 158 Parameters that can only be Specified if Parameter OUT is set to CDAM**

| Parameter | Description                                                                                                                                                                            |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OUTPUT    | See the CDAM chapter in the <i>Control-D and Control-V User Guide</i> .                                                                                                                |
| PREFIX    | See the CDAM chapter in the <i>Control-D and Control-V User Guide</i> .                                                                                                                |
| JOBNAME   | If not specified, the third parameter of the "-d" argument is used as a default.                                                                                                       |
| JOBID     | If not specified, the fourth parameter of the "-d" argument is used as a default.                                                                                                      |
| ASSOC     | See the CDAM chapter in the <i>Control-D and Control-V User Guide</i> .                                                                                                                |
| LINECT    | See the CDAM chapter in the <i>Control-D and Control-V User Guide</i> .                                                                                                                |
| PAGEDEF   | See the CDAM chapter in the <i>Control-D and Control-V User Guide</i> .                                                                                                                |
| FORMDEF   | See the CDAM chapter in the <i>Control-D and Control-V User Guide</i> .                                                                                                                |
| PGMSTEP   | See the CDAM chapter in the <i>Control-D and Control-V User Guide</i> .                                                                                                                |
| PROCSTEP  | See the CDAM chapter in the <i>Control-D and Control-V User Guide</i> .                                                                                                                |
| CDAMPRM   | The CDAM parameters that are described in the CDAM chapter in the <i>Control-D and Control-V User Guide</i> . The parameters are separated by commas and should be enclosed in quotes. |



The following table describes the special variables used for the Control-D File Transfer Option.

**Table 159 Special Variables used for Control-D File Transfer Option**

| Variable   | Description                                                                              |
|------------|------------------------------------------------------------------------------------------|
| %GROUP%    | GROUP_ID defined in the SesAgent command-line -d parameter                               |
| %REPORT%   | REPORT_ID defined in the SesAgent command-line -d parameter (first 20 characters)        |
| %REPORTX%  | REPORT_ID defined in the SesAgent command-line -d parameter (all 50 characters)          |
| %DATE%     | current date (date files are processed by Control-D File Transfer option)                |
| %TIME%     | current time                                                                             |
| %JOBNAME%n | name of the job of the output data set defined in the SesAgent command-line -d parameter |
| %JOBID%    | ID of the job of the output data set defined in the SesAgent command-line -d parameter   |

## Using the zIIP processor by the Control-D File Transfer Option

The ZIIPXBMA parameter is provided in the IOAPARM member for offloading Control-D File Transfer option (FTO) and Control-D Application Server I/O workloads to zIIP with XBM. The default is Y, that the I/O workloads are offloaded to zIIP with XBM.

The XBM modify command allows the FTO to activate the offloading of eligible I/O workloads from general purpose processors to zIIP processors with XBM. This way XBM address space can be started after INCONTROL address spaces, without requiring the INCONTROL address spaces to be restarted.

For the FTO, the XBM modify operator command syntax is as follows:

```
F IOAGATE, MODASID=nn MODAPPL F XBM
```

where *nn* is the decimal sequential ASID number of the FTO address space to which the modify command is submitted. The modify command is broadcast to all active FTO address spaces if the ASID number '*nn*' is omitted.

## Examples

### Example 1

---

```

Member WORD:
++++*
* TRANSFER PARAMETERS
TYPE=BIN
LINESEP=NONE
PAGESEP=NONE
OUT=CDAM
REENTRY=USER=ADMIN, NAME=%REPORT%, MIGRATE=MIGWORD
* ALLOCATION PARAMETERS
PREFIX=FTO
ASSOC=DOC
* POST-PROCESSING PARAMETERS
WTO='Report %REPORT%, group %GROUP% - has arrived'

```

---

According to this example, each file that is transferred with GROUP\_ID (using the -d argument of Sesagent) of WORD is written to CDAM as is, without translation to EBCDIC and with dataset prefix FTO. JOBNAME and JOBID (the third and fourth subparameters of the -d argument), and associated extension DOC, is also used as parameters for CDAM.

The REPORT entry and SYSDATA record associated with the CDAM is then added to Active User file. The new REPORT entry and SYSDATA record are created for recipient ADMIN with a report name of REPORT\_ID, where REPORT\_ID is the second subparameter of the Sesagent -d argument, and is associated with the same JOBNAME, JOBID, and ASSOC parameters as CDAM. Migration mission MIGWORD is associated with the report.

A WTO message is issued when the transfer is completed.

### Example 2

---

```

Member $SFTDFLT:
TYPE=A
FIRSTLINE=' USER=%GROUP% , REPORT=%REPORT% , DATE=%DATE%%TIME%'
* CLASS=A
LRECL=255
RECFM=VA

```

---

Every transferred file is written to the spool to class A with a logical record length of 255 and a record format of VA. Each line is translated from ASCII to EBCDIC through the default table. Line separation and page separation are according to CRLF and FF characters.

The following line is inserted at the beginning of the report:

---

```

USER=PROD , REPORT=REPORT_EXAMPLE DATE=030700182030

```

---

The following code illustrates a generic decollation missions that can decollate a resulting SYSOUT:

```

----- Control-D/V CATEGORY DECGEN                JOB *                ----- (R. S)
COMMAND ==>   SCROLL==> CRSR
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| CATEGORY DECGEN                JOBNAME *                GENERIC Y MONITOR |
| ===== |
| DEF COPIES    LVL    USER                DEST                MAX COPIES |
| ===== |
| ON CLASS      = A                EXTWTR                DEST                FORM |
| PRT COPIES    LVL    USER                DEST                MAX COPIES |
| PRINT/CDAM PARMS = |
| DO |
| WHEN LINE      -                COL      -                PRINT  REF NXT  CT      ND/OR |
| STRING = |
| DO NAME      = TEST FROM GENERIC |
| DO USER      = DEC                LVL    LINE                COL      - |
|                S A T A                SYNONYM =                CONCAT = |
| DO INDEX      = JOBNAME_DDNames                R      G |
| DO INDEX      = AS##                R      G    LINE                COL 00001 - 00005 |
| MASK = ##                RC N LINE      -                COL 00001 - 00003 |
| SUBINDX =                LVL    LINE                COL      - |
| MASK =                RC    LINE      -                COL      - |
| ===== |
|                INDEX LEVEL DISPLAY |
FILL IN REPORT DEFINITION. CMDS: EDIT, SCHED, SHPF, PATH                14.56.52

```

In decollation missions the DO NAME, DO USER, and DO REMARK statements use corresponding values from the first (added) line of the report.

## Exits

Security Exit CTDSE27 and User Exit CTDX027 are invoked by FTO.

For a description of User Exit CTDX027, and all other exits, see [Exits](#) (on page 745).

For a description of Security Exit CTDSE27, see the *INCONTROL for z/OS Security Guide*.

## Mainframe – PC File Transfer

When Control-D/WebAccess Server is installed, files can be transferred from the mainframe to the PC. These transfers can be initiated from the mainframe (Push mode) and from the PC (Pull mode).

File transfers in Push mode can be implemented through KeyStroke Language KSL scripts or by the File Transfer Monitor. For information about performing file transfers with scripts, see the *Control-D/WebAccess Server Administrator Guide*.

File transfers in Pull mode can be implemented manually by the user through Control-D/WebAccess Server commands and automatically by the Control-D/WebAccess Server on the LAN. For information about these methods, see the *Control-D/WebAccess Server User Guide*.

At most sites, file transfers are made in Push mode. At some sites, Pull mode may be more appropriate, especially if the LAN is not active 24 hours a day or PC users are often not connected to the LAN.

## File Transfer Monitor

The File Transfer monitor transfers Control-D/WebAccess Server packet files from the Mainframe to the PC. It activates the file transfer in PUSH mode. The File Transfer monitor is a started task activated by procedure CTDFTM that operates 24 hours a day.

## File Transfer Protocols

The File Transfer monitor currently supports TCP/IP and XCOM 6.2 protocols. The default protocol is TCP/IP. User Exit CTDX023 can be used to designate the desired file transfer protocol. Sample Exit CTDX023C provides XCOM 6.2 support.

## File Transfer Process

The File Transfer monitor examines the Active Transfer file and selects all entries with status WAIT TRANSMISSION and TRANSMITTING. From these entries, it selects entries whose IP address is defined in the Control-D Recipient Tree and organizes these entries in queues according to the IP address of the recipients that these entries belong to.

The IP host name can be defined in the Recipient Tree as follows:

| RECIPIENT | USERNAM        | RECIPIENT LEVEL 55 | PARENT MGT | PARENT LEVEL |
|-----------|----------------|--------------------|------------|--------------|
| DESC      | DEVELOPMENT    | DEPARTMENT         |            |              |
| DESC      | IP=host - name |                    |            |              |

where host-name is the logical name of the computer where the TCP/IP server is running.

The IP address can be defined in the Recipient Tree as follows:

| RECIPIENT | USERNAM                    | RECIPIENT LEVEL 55 | PARENT MGT | PARENT LEVEL |
|-----------|----------------------------|--------------------|------------|--------------|
| DESC      | DEVELOPMENT                | DEPARTMENT         |            |              |
| DESC      | IP=128. 131. 100. 90: 1948 |                    |            |              |

where 128.131.100.90 is the physical IP address, and 1948 is the port number.

For protocol XCOM6.2, the IP address is the LU name.

In order to improve the performance of the transfer of reports to the PC, the compression option can be used. In this case, data which is transmitted via the TCP/IP link is compressed.

The monitor controls the compression option according to the parameter specified in the Recipient Tree.

To compress data to be transmitted to the PC, the DESC parameter in the user description in the Recipient Tree must be specified with a C at the end, as follows:

|      |                               |
|------|-------------------------------|
| DESC | IP=128. 131. 100. 90: 1948, C |
|------|-------------------------------|

or

|             |                                |
|-------------|--------------------------------|
| <b>DESC</b> | <b>IP=128. 131. 100. 90, C</b> |
|-------------|--------------------------------|

where

- 128.131.100.90 is the physical IP address
- 1948 is the port number
- C indicates that the data is compressed

The File Transfer monitor starts a subtask for each queue (each IP and port). The maximum number of subtasks that can be activated is limited by a parameter of the File Transfer monitor procedure. If the maximum number of subtasks is lower than number of created queues, the File Transfer monitor activates the maximum number of subtasks. As soon as a subtask terminates file transfer of all packages in its queue, the File Transfer monitor activates a new subtask, which picks up a queue waiting for processing.

The process transfers the PIX and CDAM files for each entry.

Each subtask transfers packages from the queue, one by one, using a program that communicates with the session manager. This program uses TCP/IP commands to establish connection, send buffers, and receive acknowledgement. This mechanism enables you to transfer packages without size limitations. You can use this mechanism without adversely affecting network processing performance.

You can further increase performance levels by activating several subtasks in parallel.

BMC Software recommends that you perform File Transfer monitor tests in your specific environment, because performance is affected by many factors, including

- the number of IP addresses to which distribution is being made
- the number of packages being transferred
- the size of the packages being transferred
- the number of subtasks under the Control-D File Transfer monitor
- the time when the transfer process is performed.

A major advantage of the Control-D File Transfer monitor is that it can process the packages at times when network workload is light. For example, reports that are created during evening hours can be transferred to users before the start of their working day, which frees up network resources during regular business hours, so those resources can be used for other purposes.

For each transferred package, the File Transfer monitor issues a message with information that provides

- IP address
- file name
- START time
- END time

The status of each entry in the Active Transfer file is changed to TRANSMITTED OK if the corresponding files were transmitted successfully, or to WAIT TRANSMISSION if the files were not transmitted successfully for some reason.

On the Control-D/WebAccess Server side, the TCP/IP server must be running and Control-D/WebAccess Server Import must be running in Reports From Disk mode. We recommend using Reports From Disk in Global Polling mode to import reports automatically. For each local area network, BMC recommends using one Control-D/WebAccess TCP/IP Server and running Control-D/WebAccess Server Import at only one station. For more information on this topic, see the Control-D/WebAccess Server Administrator Guide.

After the File Transfer monitor processes all entries in the Active Transfer file, it waits a predefined period of time. The monitor then repeats the scanning process to find files associated with new entries in the Active Transfer file and files that need to be retransmitted for some reason.

## Activating and Stopping the File Transfer Monitor

- To activate the File Transfer monitor, issue operator command  
`S CTDFTM`
- To stop the File Transfer monitor, issue operator command  
`P CTDFTM`

## Reawakening the File Transfer Monitor

To reawaken the File Transfer monitor, issue operator command

---

**F CTDFTM, TRANSFER**

---

This command causes the File Transfer monitor to immediately scan the Active Transfer file even if the specified time interval has not elapsed.

## Reloading the Recipient Tree

To reload the Recipient Tree, issue operator command

---

**F CTDFTM, LOADTREE**

---

This command can be used to reload the Recipient Tree without stopping the File Transfer monitor. For more information, see [Loading the Recipient and Approval Tree](#) (on page 372).

## Displaying the Active Subtasks List

To display the File Transfer monitor active subtasks list, issue operator command:

---

**/F CTDFTM, LIST**

---

This command can be used to display the File Transfer monitor's active subtasks list.

## Canceling the Active Subtask

To cancel the File Transfer monitor active subtask, issue one of the following operator commands:

---

```
/F CTDFTM, CANCEL, xxx
```

---

where xxx is the subtask number, according to the active subtask list created by the LIST command, or

---

```
/F CTDFTM, CANCEL, IP=xxxxxxxxxxxxxxxx: xxxxx
```

---

where xxxxxxxxxxxx:xxxxx are the IP address and port, respectively.

These commands can be used to cancel the File Transfer monitor subtask.

## Immediately Stopping File Transfer Monitor Activities

To perform an emergency stop of the File Transfer monitor activities, issue operator command

---

```
/F CTDFTM, SUSPEND
```

---

This command can be used to stop File Transfer monitor activities.

## Changing the Wakeup Interval

To dynamically modify the File Transfer monitor wakeup interval, issue operator command

---

```
/F CTDFTM, INTERVAL=xxx
```

---

where xxx is the time interval, in minutes, after which the Active Transfer file is examined for files waiting to be transferred.

This command can be used to change the File Transfer monitor wakeup interval.

## File Transfer Monitor Parameters

The following table describes the parameters that affect the activity of the File Transfer monitor:

**Table 160 Parameters that affect the File Transfer Monitor**

| Parameter | Description                                                                                                                                                                                   |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TASKS     | Maximum number of parallel transfer processes that can exist concurrently. Default: 30. The actual number of concurrent transfer processes does not exceed the number of unique IP addresses. |
| ID        | Subsystem ID of the Interlink TCP/IP. This parameter enables the Control-D File Transfer Monitor to work with an Interlink TCP/IP with a subsystem ID that is other than the default.         |

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                          |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INTERVAL  | Time interval after which the Active Transfer file is searched for files waiting to be transferred. The value is specified in minutes. Default 10.<br><br>If the INTERVAL parameter value is specified as 9999, the File Transfer monitor does not search for all entries to be transferred. The transfer process is activated when the MODIFY command /F CTDFTM,TRANSFER is issued. |
|           | Activating this option bypasses the automatic transfer.                                                                                                                                                                                                                                                                                                                              |

The following command limits the File Transfer monitor to a maximum of 20 concurrent transfer processes and causes the monitor to be activated every 15 minutes.

```
S CTDFTM, TASKS=20, INTERVAL=15
```

## Report Distribution from Control-D using Control-D/Delivery Server

Reports processed by Control-D can be distributed to e-mail addresses, faxes, network printers, and to the Control-D Repository using the Report Transfer mechanism. The distribution process can also be used to transform reports in AFP and XEROX format to PDF and HTML. In addition, the Control-D Event Manager can be used for sending notifications about report availability.

This section describes what is required of the users to implement these functions, how the system works, troubleshooting, and transformation considerations.

The instructions included here are for users of Control-D version 6.1.07 and later with Control-D/Delivery Server version 3.5. xx and later.



## User Requirements

### Report distribution setup in Control-D for z/OS

1. Set the following parameters in the CTDSPARM member in the CTD PARM library:

| Parameter      | Description                                                                                                                                                                                                                                                        |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HOST           | Host name or IP address of Control- D for DS Distribution Server. ",C" after the host name or value indicates that data compression is required during report transfer. The compression option is available in Control-D/Delivery Server version 3.5.xx and later. |
| PORT           | Default port number for session manager in Control-D/Delivery Server.                                                                                                                                                                                              |
| MAIL_HOST SMTP | Host name to be used by the Distribution Server for sending e-mail messages                                                                                                                                                                                        |
| DSR_NAME DS    | Repository name as it appears in Control- D/Desktop (for example, "Repository NT -TLV475")                                                                                                                                                                         |
| MFR_NAME MF    | Repository name as it appears in the "External Repositories" section in Control-D/Desktop (for example, IOAR610)                                                                                                                                                   |
| USER_NAME POD  | User name to be used for Resource retrieval                                                                                                                                                                                                                        |
| PASSWORD       | Password for the above POD User                                                                                                                                                                                                                                    |

The MFR\_NAME, USER\_NAME, and PASSWORD parameters are used for Resource retrieval from the MF Repository when the report is processed in Control- D by ON TRNCLASS (or ON TRNDSN) decollation and it is transformed into PDF or HTML format in Control-D/Delivery Server. Note also that the user specified in the USER\_NAME field requires authorization for POD, but does not require authorization to access reports.

2. Customize external destinations in Control-D if required. The Control-D installation contains a predefined set of destinations for report distribution as specified below:

| Parameter | Description                                                                   |
|-----------|-------------------------------------------------------------------------------|
| FTB2P     | For sending AFP/XEROX reports to File Transfer with transformation to PDF     |
| FTPDPF    | For sending PDF reports to File Transfer                                      |
| FTTXT     | For sending text report to File Transfer                                      |
| FTT2P     | For sending AFP/XEROX reports to Local File System with transformation to PDF |
| LFSB2P    | For sending AFP/XEROX reports to Local File System with transformation to PDF |
| LFSPDF    | For sending PDF reports to Local File System                                  |
| LFSTXT    | For sending text report to Local File System                                  |
| LFST2P    | For sending text reports to Local File System with transformation to PDF      |
| LPRB2P    | For sending AFP/XEROX reports to printer                                      |
| LPRPDF    | For sending PDF reports to printer                                            |
| LPRTXT    | For sending text report to printer                                            |
| MAILB2P   | For sending AFP/XEROX reports by e-mail with transformation to PDF            |
| MAILPDF   | For sending PDF reports by e-mail                                             |
| MAILTATT  | For sending text reports by e-mail as attachment                              |
| MAILTXT   | For sending text report by e-mail (body)                                      |
| MAILT2P   | For sending text reports by e-mail with transformation to PDF                 |

These destinations contain variables, which are substituted during the report transfer process.

The %FOLDER%, %EMAIL%, and %FAX% variables are substituted according to the Description field in the Recipient Tree, where they can be defined as DESC FOLDER=xxx.

The %REPORT%, %REMARK%, %JOBNAME%, %ODATE%, %USER%, %REPORTID%, %JOBID%, %CLASS%, %EXTWTR%, %FORM%, %DEST%, and %TYPE% variables are substituted according to the attributes of the report being distributed.

In most cases, the predefined External Destinations can be used 'as is'. If required, they can be customized through IOA Online (see the Control-D/Delivery Server section in the *Control-D and Control-V User Guide*). The following options were added after the release of version 6.1. xx product manuals:

| Option | Field Location   | Required Action                                                                                  |
|--------|------------------|--------------------------------------------------------------------------------------------------|
| L      | CONVERT TO ASCII | Translate report from EBCDIC to ASCII and add CRLF line separator (default line separator is LF) |
| P      | SEND WITH CC     | Add FF as page separator for text report transfer                                                |

3. Set the following additional parameters in CTDSPARM member used for subscription:

| Parameter    | Description                                                                                                                                                                                                                                                                                                                                       |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NOTIFICATION | Specifies the default external CTDS destination. Used for distributing e-mails with notification of subscribed reports. The destination must be available in the Control-D repository. Mandatory if the customer wants to use subscription for sending notification about the reports (indexes) created in the Control-D repository to end-users. |
| E_MAIL       | Specifies the default external CTDS destination. Used for distributing subscribed reports by e-mails. The destination must be available in the Control-D repository. Mandatory if a customer wants to use subscription for sending reports (indexes) to end-users.                                                                                |
| HOST_PRINT   | Specifies the default local or remote JES printer destination (node and user ID). One or two sub-fields can be specified. If it consists of two sub-fields, they must be enclosed in brackets. Used for printing subscribed reports to SPOOL. Optional.                                                                                           |
| PRINT_NOTIFY | Specifies the name of the default print mission for processing subscribed reports.                                                                                                                                                                                                                                                                |

## CTDDS ATTRIBUTES

Control-D External Destinations includes CTDDS ATTRIBUTES statements. These statements can contain the variables described in the previous section. After the variables are resolved, most of the attributes are passed to Control-D Delivery Server and used for the report distribution. These attributes are described in the *Control-D Delivery Server Administration Guide*.

The attributes which are processed on the mainframe side are described below.

| Attribute                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TRNTAB= <i>tabname</i>       | <p>This parameter can be specified in CTDDS ATTRIBUTES, if the CONVERT TO ASCII parameter is set to YES.</p> <p>When TRNTAB is specified, the translation table that is stored in the <i>tabname</i> member in the IOA PARM library is used for the translation from EBCDIC to ASCII.</p> <p>If the parameter TRNTAB is not specified, the TRNE2A default translation table is used for translation from EBCDIC to ASCII.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| BODYTEXT= <i>member_name</i> | <p><i>member_name</i> is the name of the member in the IOA BANNERS library containing the body text of the e-mail that the distributed report is attached to. This member can contain one or more sections, each containing the body text associated with a different report name. Each section starts with a +++<i>repname</i> statement, where <i>repname</i> is either a complete report name or a mask.</p> <p>Only the body text from one section is used for a specific report name. Since the first <i>repname</i> that matches the report name determines which section provides the body text, the <i>repname</i> statements must be listed in order, starting with specific names and ending with the most general mask.</p> <p>Lines beginning with asterisks are comments and are not included in the body text of the email.</p> <p>The body text, which follows the statement, can be simple text or HTML. The text is then converted to ASCII and sent to the Control-D Delivery Server.</p> <p>Example:</p> <p>The parameter BODYTEXT=MYBODY is specified in CTDDS attributes. The MYBODY member contains the following statements:</p> <pre>+++REP*     line 11     line 12     line 13 +++*     line 21     line 22</pre> <p>The text consisting of line 11, line 12, and line 13 will be inserted into emails that are distributing reports with report names starting with REP.</p> <p>The text consisting of line 21, and line 22 will be inserted into all other emails that are distributing reports.</p> |

| Attribute                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RECIPIENT= <i>list of recipients</i> | <p>The <i>list of recipients</i> can contain several entries separated by semicolons. Each entry can be specified as:</p> <ul style="list-style-type: none"> <li>▪ <i>e-mail address</i></li> <li>▪ %EMAIL%</li> <li>▪ <i>member_name</i></li> </ul> <p>The %EMAIL% variable is resolved by the list of the e-mail addresses or member names defined in the CTD tree recipient entry. The <i>e-mail_address</i> or <i>member_name</i> must be specified in a description statement, such as EMAIL= <i>e-mail_address</i> or EMAIL= <i>member_name</i>. Several such description statements can be defined in the recipient entry.</p> <p>The <i>member_name</i> variable is the name of the member containing a list of e-mail addresses in the IOA BANNERS library. This member can contain one or more sections, each containing a list of e-mail addresses associated with a different report name. Each section starts with a +++<i>repname</i> statement, where <i>repname</i> is either a complete report name or a mask. In each list, the e-mail addresses related to the specified report name are defined. Each e-mail address starts from the beginning of a new line and is defined as EMAIL= <i>e-mail_address</i>. If the definition cannot fit on one line, it can be continued from any position on the next line (without the EMAIL= keyword).</p> <p>Only one list of e-mail addresses from one section is used for a specific report name. Since the first <i>repname</i> that matches the report name determines which section provides the list of e-mail addresses, the <i>repname</i> statements must be listed in order, starting with specific names and ending with the most general mask.</p> <p>Example:</p> <p>The following is specified in CTDDS attributes:</p> <pre>RECIPIENT=%EMAIL% ;MAILLST</pre> <p>The following is specified in the CTD tree:</p> <pre>DESC EMAIL=myaddress@bmc.com</pre> <p>The MAINLST member contains the following lines:</p> <pre>+++REP* EMAIL=recip1@bmc.com EMAIL=recip2@bmc.com +++* EMAIL=recip3@bmc.com</pre> <p>Reports with names started with REP will be distributed to:<br/>myaddress@bmc.com; recip1@bmc.com; recip2@bmc.com</p> <p>All other reports will be distributed to:<br/>myaddress@bmc.com; recip3@bmc.com</p> |

## Report distribution setup in Control-D/Delivery Server

1. Define an External Repository with the host and port served by IOAGATE in Control-D for z/OS.
2. Verify that the Session Manager and Automation process is installed on the computer where the Distribution Server runs.

The Automation process includes a default rule that invokes the REPMGR utility for every report that arrives from Control-D for z/OS. More details about the REPMGR utility can be found in the *Control-D Delivery Server Administration Guide*.

## How the System Works

### Report distribution process in Control-D for z/OS

Report distribution is performed by Immediate or Deferred print when a report destination is specified as 'CTDS extdest,' where extdest is predefined or a user-defined External Destination name. The report destination can be defined in a decollation mission, in the Recipient Tree, or in the Permanent User File. For further details about how to specify report destinations, see the *Control-D and Control-V User Guide*.

The Print mission or the Immediate Print module builds three files for every report to be distributed and sends these files to the Session Manager running on the Distribution Server. These files have the following extensions:

|      |                                     |
|------|-------------------------------------|
| .rep | report content                      |
| .cfg | report and destination attributes   |
| .pag | report indexes and page information |

File transfer is performed through TCP/IP; therefore, the corresponding address space must have an OMVS segment defined in RACF (or in the appropriate definitions in ACF2 or TSS).

## ASA code support for Control-D for z/OS reports when sending reports to Control-D/Delivery Server

When sending ASA code reports to Control-D/Delivery Server, there are special considerations.

When sending the reports to a Control-D/Delivery Server Repository (DSR), reports should be sent with CONVERT TO ASCII = L as the CRLF line separator (the default line separator is LF) and SEND WITH CC = P (add FF as page separator for text report transfer instead of ASA code 1).

The reports will be viewed with ASA code support in Control-D/Web Access, if the RECFM attribute is FBA or VBA.

When sending the reports to the Repository is done with transformation to PDF, or the reports are sent to other locations (LPR, file system, email ..)

- The reports must be sent with CONVERT TO ASCII = L and SEND WITH CC = Y (all ASA codes are sent).
- The transformer\_to=txt parameter must exist in the Control-D/Delivery Server attributes.
- A report clique must be used. Define report\_clique=report-clique-name in the Control-D/Delivery Server attributes. A report clique with the report-clique-name must be defined in the Control-D/Delivery Server Desktop. It should resemble the sample MF\_ASCII report clique, with Print Control Char=ASA, Page Delimiter String=1, and Page Delimiter Pos=1.
- When sending to LPR or File System, in a Unicode installation, target\_encoding=latin1 or the correct local encoding must be defined, since the default target encoding for Unicode text reports is UTF8, which usually is not supported by the printers.
- When sending to LPR or File System, the report clique must have also Add Page Delimiter Hex = FF for the printer to print separate pages.

This parameter is supported in Control-D/Delivery Server version 3.6.00 with Fix Pack 6 or version 3.7.01, or later.

## Troubleshooting

### Tracking report distribution process

The procedure to track a report that does not reach its final destination is shown below:

1. Check the status of the report in screen U of Control-D for z/OS.
  - If the status is PRINTED, the report has been transferred successfully to DS, and you should proceed to the instruction in paragraph 2.
  - If the status is NOT PRINTED, check the IOALOG, fix the problem and reprint the report. For example, if the Session Manager is inactive, it should be started on the Distribution computer.
2. Check whether the report files are in the tmp directory of the Distribution Server installation.
  - If they are, the Automation Server is probably not active or is incorrectly configured.
  - If files are not in the tmp directory, check the failed directory.
3. If the files are located in the failed directory, the REPMGR utility failed. Check the error.log file and find the error messages related to the REPMGR utility.
4. If the .cfg file is in the done directory (not in the failed directory), the report is queued for distribution and should appear in the Distribution Monitor in the Control-D/Desktop.
5. Check the report status there. If the status is Failed, check the error.log for "distribute" error messages.

## Transformation considerations

1. If a print stream report is decollated in Control-D for z/OS through an ON TRNDSN or an ON TRNCLASS statement, its Resource ID is put into a .cfg file. Control-D for DS retrieves the Resource Set record from Active User File and determines which resources are needed for report transformation. The resources are retrieved from the mainframe through POD and are put into the Distribution Server transformer\res directory. When the same or a similar report is distributed again, all resources are already located on the local disk, so they will not be retrieved again from the mainframe.
2. If the distributed report is decollated in the standard manner, that is, through an ON CLASS or an ON DSN statement, the transformation process takes its resources from the transformer\res directory. The resources for the report must be put in the transformer\res directory manually.
3. You should transform text reports to PDF format for e-mail distribution, because the resulting files are usually smaller than the original text reports. If this option is used, define a new External Destination as outlined in the following example:

```
DSRTPDF ctd_repo
HOST PORT CONVERT TO ASCII L
CTDDS TTRIBUTES SEND WITH CC P
rhost="%DSR_NAME%" folder="%FOLDER%"
owner=Control-D original_type="%TYPE%"
transformer_to=PDF
```

## Sending Control-D reports to destinations CTDS and CTDPD

The ISOCKAPI, ISTACK, and IPVMODE parameters in IOAPARM IP section also affect file transfers to destinations CTDS and CTDPD. For more information, see [General IP parameters](#) (on page 119).

## Control-D/Image

Control-D/Image facilitates the viewing of scanned images of documents such as bank checks, trade invoices, monthly bills, and applications for insurance. It enables output from commercial imaging equipment to be imported into either Control-D or Control-V for decollation, distribution, and viewing, and into Control-V for archiving and indexed retrieval.

If the appropriate password has been obtained and entered in member PASDIMG in the IOA PARM library, Control-D and Control-V support the decollation, indexing and archiving of PC-originated image files and binary large object (BLOB) files. Archived files can be retrieved through indexes for viewing using Control-D/Page On Demand and Control-D/WebAccess Server associated file support.

The PC files are packed by a PC utility (CTVPACK) into a flat control file whose first line contains file identification and indexing information. The packed files are uploaded to the mainframe and transformed into CDAM files that can be migrated and retrieved by Control-V.

You can also pack the Image binary files on the mainframe directly to a Control-D CDAM file, or to spool, by using the CTVPACK REXX utility.



## Sample Files

The following table describes the files that are supplied with Control-D/Image:

**Table 161 Control-D/Image Files**

| File        | Description                                                                                                                                                                                                                                                                  |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CDAMCRE.JOB | Mainframe job that creates a CDAM file from the packed file that is transferred in binary mode from the PC.                                                                                                                                                                  |
| CTVPACK.BAT | Batch file to be used for packing images before archiving on mainframe. Each line of this file contains parameters that specify the type of files to be packed, format of the file identification data, name of the control file, and name of the output file to be created. |
| CTVPACK.EXE | Packing program.                                                                                                                                                                                                                                                             |
| DECMIS.BIN  | Sample decollation mission. This mission can be transferred to the mainframe in binary mode and used as a sample.                                                                                                                                                            |
| DECMIS.TXT  | Sample decollation mission (identical to DECMIS.BIN, but viewable).                                                                                                                                                                                                          |
| LIST.TXT    | Sample control file that points to two GIF files (LOAN01 and LOAN02) with extracted data.                                                                                                                                                                                    |
| LOAN01.GIF  | Sample GIF file #1 (scanned from a loan form).                                                                                                                                                                                                                               |
| LOAN02.GIF  | Sample GIF file #2 (scanned from a loan form).                                                                                                                                                                                                                               |
| PACKED.GIF  | File created by the packing program using the two sample GIF files and the sample control file. This file is transferred to the mainframe in binary mode.                                                                                                                    |

## Implementing Control-D/Image

The CTVPACK.EXE program must be installed on, or be accessible to, each PC that has entities to be uploaded to the mainframe. The CTVPACK.BAT batch file contains a description of the parameters used when invoking the CTVPACK.EXE packing program.

The packing program can handle the following objects:

- images that can be scanned by almost any scanning system to produce uploadable PC objects  
The output of the scanning system must be a flat control file with one control record for each object.
- word documents, Excel spreadsheets, and so on  
For these files, it may be necessary to produce control records manually.

Each record in the control file (for example, the sample LIST.TXT file) contains the name of the PC object and indexing data extracted from the object. All the objects must be accessible to the packing program.

## Packing and Transferring Control-D/Image Files

The packing program creates the control file with all the objects and their indexing data packed together. The current version supports the packing of multiple objects if all the objects are of the same type.

Manually transfer the packed file (created by the packing program) to the mainframe in binary mode into a file with RECFM=FBA,LRECL=80.

Use a utility such as IEBGENER with the following JCL to convert the transferred file into a CDAM file, with BLOB=typ in the CDAM parameters:

```
//SYSUT2 DD SUBSYS=(R504, 'PREFIX=N50. NDS, BLOB=GI F' ),
//          DCB=(BLKSIZE=8000, LRECL=80, RECFM=FBA)
```

## Packing Control-D/Image Files on the Mainframe

The binary Images stored in datasets can be packed on the mainframe using the supplied CTVPACK REXX utility. The CTD PACKLIST control file (similar to LIST.TXT pc file) should be created as input for this utility. Output of this utility, which contains an 80 byte BLOB record before each binary object, is directed either to CDAM file or spool in order to use it in the Control-D decollation mission. For further details on how to use the utility, see the supplied CTVPACK JCL member.

## Decollating and Indexing Control-D/Image Files

Decollate the CDAM file. Use DO INDEX to index the report and use the control line created by the packing program for index value extraction. Use DO MIGRATE to control migration of the CDAM file. The sample report decollation mission (in file DECMIS.TXT) is illustrated below.

When planning the decollation mission definition, the locations of values to be extracted (name, index values, and so on) are based on the BLOB description line that is added by the CTVPACK program. In the current version of the packing program, the actual key specified in the control file begins in column 33.

In the sample report decollating mission illustrated below, character string 'KEY' is used as a mask in columns 29 through 31 to ensure that valid index values are extracted by the DO INDEX statement.

**Figure 54 Sample Report Decollating Mission**

| CATEGORY DEMOLOAN   |                  |                   | JOBNAME N50LOAN |           | GENERIC   |           | MONITOR    |  |
|---------------------|------------------|-------------------|-----------------|-----------|-----------|-----------|------------|--|
| =====               |                  |                   |                 |           |           |           |            |  |
| DEF COPIES          |                  | LVL               | USER            |           | DEST      |           | MAX COPIES |  |
| =====               |                  |                   |                 |           |           |           |            |  |
| ON DSN              |                  | = PREFIX=N50. GIF |                 |           |           |           |            |  |
| PRT COPIES          |                  | LVL               | USER            |           | DEST      |           | MAX COPIES |  |
| PRINT/CDAM PARMS =  |                  |                   |                 |           |           |           |            |  |
| WHEN LINE           | -                | COL               | -               | PRINT     | REF NXT   | CT        | ND/OR      |  |
| STRING =            |                  |                   |                 |           |           |           |            |  |
| DO USER             | = DEMO           | LVL               | LINE            | COL       | -         | S A T     |            |  |
|                     |                  |                   |                 | SYNONYM = |           | CONCAT =  |            |  |
| DO INDEX            | = ACCOUNT        | LINE              | 001             | COL       | 043 - 048 | R         | G          |  |
| MASK                | = KEY            | LINE              | 001 - 001       | COL       | 029 - 031 | REC       | N          |  |
| SUBINDX             | =                | LVL               | LINE            | COL       | -         |           |            |  |
| MASK                | =                | LINE              | -               | COL       | -         | REC       |            |  |
| =====               |                  |                   |                 |           |           |           |            |  |
| INDEX LEVEL DISPLAY |                  |                   |                 |           |           |           |            |  |
| ACCOUNT             |                  |                   |                 |           |           |           |            |  |
| =====               |                  |                   |                 |           |           |           |            |  |
| DO INDEX            | = AMOUNT         | LINE              | 001             | COL       | 050 - 054 | R         | G          |  |
| MASK                | = KEY            | LINE              | 001 - 001       | COL       | 029 - 031 | REC       | N          |  |
| 02 SUBINDX          | = ACCOUNT        | LVL 02            | LINE            | 001       | COL       | 043 - 048 |            |  |
| MASK                | = KEY            | LINE              | 001 - 001       | COL       | 029 - 031 | REC       | N          |  |
| SUBINDX             | =                | LVL               | LINE            | COL       | -         |           |            |  |
| MASK                | =                | LINE              | -               | COL       | -         | REC       |            |  |
| =====               |                  |                   |                 |           |           |           |            |  |
| INDEX LEVEL DISPLAY |                  |                   |                 |           |           |           |            |  |
| AMOUNT / ACCOUNT    |                  |                   |                 |           |           |           |            |  |
| =====               |                  |                   |                 |           |           |           |            |  |
| DO INDEX            | = PERIOD         | LINE              | 001             | COL       | 056 - 057 | R         | G          |  |
| MASK                | = KEY            | LINE              | 001 - 001       | COL       | 029 - 031 | REC       | N          |  |
| 02 SUBINDX          | = ACCOUNT        | LVL 02            | LINE            | 001       | COL       | 043 - 048 |            |  |
| MASK                | = KEY            | LINE              | 001 - 001       | COL       | 029 - 031 | REC       | N          |  |
| SUBINDX             | =                | LVL               | LINE            | COL       | -         |           |            |  |
| MASK                | =                | LINE              | -               | COL       | -         | REC       |            |  |
| =====               |                  |                   |                 |           |           |           |            |  |
| INDEX LEVEL DISPLAY |                  |                   |                 |           |           |           |            |  |
| PERIOD / ACCOUNT    |                  |                   |                 |           |           |           |            |  |
| =====               |                  |                   |                 |           |           |           |            |  |
| DO INDEX            | = EFFECTIVE_DATE | LINE              | 001             | COL       | 059 - 066 | R         | G          |  |
| MASK                | = KEY            | LINE              | 001 - 001       | COL       | 029 - 031 | REC       | N          |  |
| 02 SUBINDX          | = ACCOUNT        | LVL 02            | LINE            | 001       | COL       | 043 - 048 |            |  |

|                          |      |                     |           |     |           |         |          |
|--------------------------|------|---------------------|-----------|-----|-----------|---------|----------|
| MASK = KEY               |      | LINE                | 001 - 001 | COL | 029 - 031 | REC     | N        |
| SUBINDX =                |      | LVL                 | LINE      | COL | -         |         |          |
| MASK =                   |      | LINE                | -         | COL | -         | REC     |          |
| =====                    |      |                     |           |     |           |         |          |
| INDEX LEVEL DISPLAY      |      |                     |           |     |           |         |          |
| EFFECTIVE_DATE / ACCOUNT |      |                     |           |     |           |         |          |
| =====                    |      |                     |           |     |           |         |          |
| DO NAME =                |      | LOAN- ARCHIVE- DEMO |           |     |           |         |          |
| DO                       |      |                     |           |     |           |         |          |
| WHEN                     | LINE | -                   | COL       | -   | PRINT     | REF NXT | CT ND/OR |
| STRING =                 |      |                     |           |     |           |         |          |

## Viewing Control-D/Image Files

Objects can be viewed in the following ways:

- using Control-D/Page On Demand under Control-D/WebAccess Server (version 3.26 and later)

In the Index/Value Selection panel, specify or select the index name and values combination required to retrieve the desired image or image list. Select the View option for the desired images to view the images. Index navigation and image viewing follows the same conventions that are used for viewing standard reports and documents.

- using Control-D/WebAccess Server

Control-D/WebAccess Server facilitates navigation and viewing of both images and standard reports and documents in the Control-D and Control-V Repository from a user's standard web browser through Internet, Intranet or Extranet connections. (Extranets connect external, authorized users to resources on a protected network.)

- using a POD-API application written in C, C++ or Visual Basic

POD-API facilitates access to both Control-D/Image objects and standard reports and documents in the Control-D and Control-V Repository by in-house developed and 3rd party applications.

## Backup Mission Management

This section discusses the following topics:

- advanced scheduling issues
  - backup according to scheduling dates
  - report decollating and backup mission dependency
- backup mission workflow
  - exception handling
- changing the backup mission retention period

## Advanced Scheduling Issues

### Backup According to Scheduling Dates

You can organize backup missions so that each day's backup management (that is, the backup workflow) is the same. The simplest method is to specify DAYS=ALL in the Basic Scheduling parameters of all backup missions. Once a day, when the New Day procedure is invoked, all backup missions scheduled for the next 24 hours are placed in the Active Missions file.

This backup organization does not maximize the capabilities of Control-D. You can organize the backup order in different ways for different days (for example, weekdays, weekends, end of the month, holidays).

Using Control-D, you can define several copies of the same backup mission. Each copy is an independent definition of the backup mission and can have different scheduling criteria, different runtime criteria, and so on.

#### Example

Backup mission BKP0031D does not start later than 06:00 on every workday, does not start later than 05:00 at the end of the month, and is not scheduled for holidays. Since there is no limit to the number of backup missions that can be defined, the user can organize the backup process to optimally suit every production day of the year.

### Report Decollating and Backup Mission Dependency

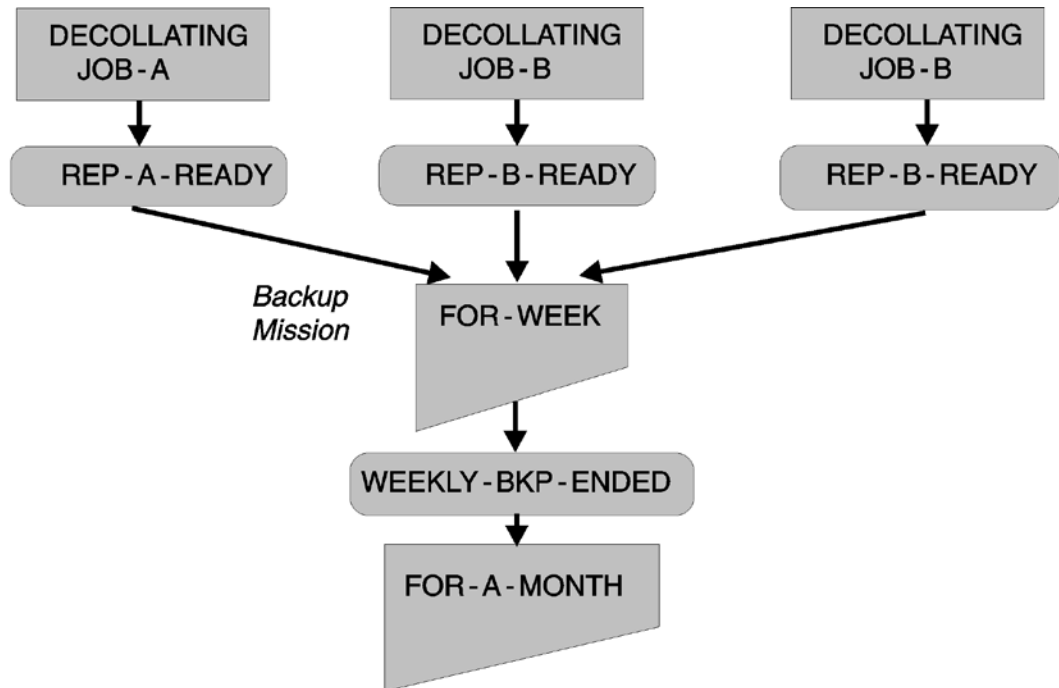
We recommend that the backup process (by Control-D backup missions) depend upon the successful decollation of reports. The dependency can be established using a prerequisite condition. Parameter OUT of the report decollating mission must specify a prerequisite condition that is referenced by parameter IN of the backup mission. Using this method, backup occurs only when all the reports that must be backed up together were decollated.

It is possible to define different report backup dependencies for different scheduling dates (for example, regular dates vs. end of the month). This can be done by using multiple copies of the same backup mission, each one distinguished by different basic scheduling criteria and different runtime scheduling criteria (prerequisite conditions, time, priority, and so on).

The following figure shows Report Decollating and Backup Mission Dependency:

**Figure 55 Report Decollating and Backup Mission Dependency**

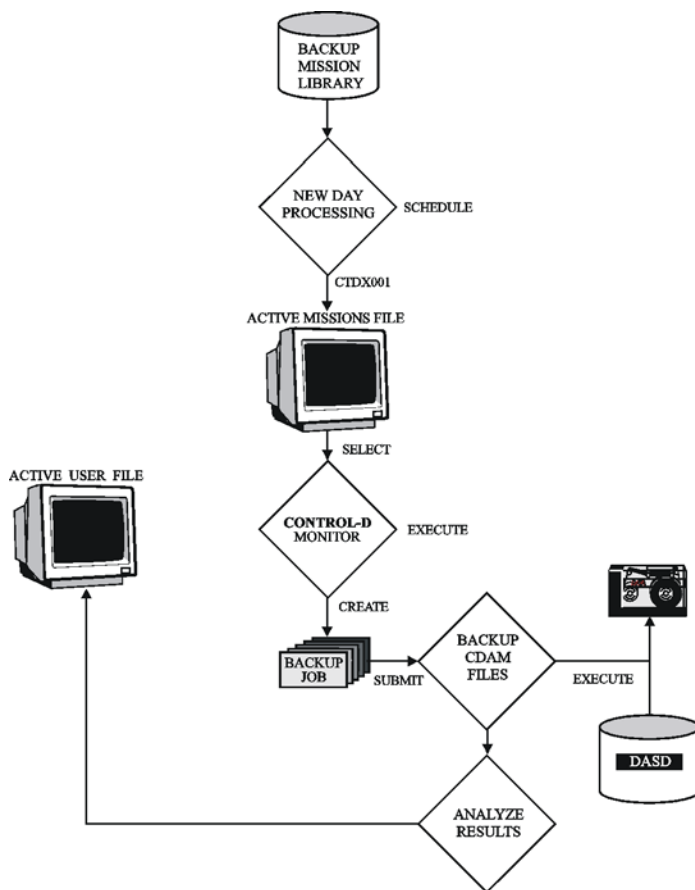
*Report  
Processing*



## Backup Mission Workflow

The backup mission workflow of Control-D is shown below. It illustrates the stages involved from initially scheduling the backup mission through backing up the CDAM datasets.

The following figure depicts the workflow of a backup mission:

**Figure 56 Backup Mission Workflow**

- The Active User Report List file is scanned by the Control-D monitor for all reports requiring backup by the specified backup mission name. (This is a fast scan, not a scan of the entire file.) Reports that have been previously backed up, or have been restored from a backup, are not backed up a second time. The result of this process is a list of dataset names to be backed up.
- The Control-D monitor reads a skeleton job from the library referenced by DD statement DADSKL of the Control-D monitor. The member name must be the same as the backup mission name (for example, BKP0031D).

Since the same library is used for printing, backup, restore and migration mission skeletons, the name of each mission must be unique.

When you define a new backup mission, you must create a new skeleton job with the same name.

The member must contain specific parameters that are interpreted by the Control-D monitor. The following table describes these parameters.

**Table 162 Mandatory Parameters for Skeleton Member**

| Parameter            | Description                                                                                                                                                                                                                                                                       |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| %DSNS%               | Resolves into a list of all the dataset names that have to be backed up. This list is in DF/DSS, DF/HSM, FDR, DMS/OS, ASM2 or ARCS format depending on installation parameters. Mandatory.                                                                                        |
| %TIMESTAMP%          | Resolves into a timestamp that is later used by Control-D for internal purposes. Mandatory.                                                                                                                                                                                       |
| %MISSNAME%           | Resolves into the backup mission name. Mandatory.                                                                                                                                                                                                                                 |
| %COND% <i>condnm</i> | When the preparation of the backup job is completed, the specified condition name is added to the IOA Conditions file. The ODAT of the condition is the original scheduling date of the backup mission. This can be used for triggering the backup job under Control-M. Optional. |
| %ODATE%              | Resolves into <i>Dyymmdd</i> , where <i>yymmdd</i> represents the ODATE of the backup mission. Optional.                                                                                                                                                                          |
| %TIME%               | Resolves into <i>T<hhmmss< i=""></hhmmss<></i> , where <i>hhmmss</i> represents the start time of the backup mission. Optional.                                                                                                                                                   |
| %RETPD%              | Resolves into <i>nnnn</i> , which represents the retention period of the produced backup data set according to the backup mission definition. Optional.                                                                                                                           |
| %EXPDT%              | Resolves into the expiration date for the produced backup data set, in <i>yyyy/dd</i> format, according to the backup mission definition. Optional.                                                                                                                               |

- When Control-D finishes preparing the member for submission, control passes to Exit CTDX010. This exit can modify the contents of the submitted job by adding, deleting or modifying the JCL. For example, the dataset names list can have a format different from the DF/DSS, DF/HSM, FDR, DMS/OS, ASM2 or ARCS format. The exit can return the following return codes:

| Code | Description                                                                                                 |
|------|-------------------------------------------------------------------------------------------------------------|
| 0    | Submit the job.                                                                                             |
| 4    | Do not submit the job (normally used when the submission is to be executed by a production control system). |



The member is written to the library referenced by DD statement DADJOB of the Control-D monitor with a name identical to the name of the backup mission. Therefore, this library must be different from the library referenced by DD statement DADSKL. The return code from the user exit determines if the job is or is not submitted. If Control-M is installed, submission of the job can be triggered by the %COND% statement. (The advantage of this method is that overall production tape workload and tape usage priority are taken into consideration when submitting the backup job.)

- The original member supplied contains the following:
  - the DF/DSS, DF/HSM, FDR, DMS/OS, ASM2 or ARCS backup utility

Control-D cannot use the ARCS, DFDSS, or FDR utility to back up CDAM data sets on more than five tape volumes unless the backup data sets are cataloged.

- a program that analyzes the output of the backup process and updates Control-D files with the results (for example, the tape numbers used)
- When the job finishes executing, the Control-D monitor is notified (by the second step) and the backup mission's post-processing parameters (OUT and SHOUT) are processed.

## Exception Handling

If the backup job abends in the first step (BACKUP), the status of the backup mission is changed to ENDED-NOTOK. When this happens, check why the abend occurred and correct the problem. After the problem has been corrected, rerun the backup mission from the Active Missions file.

If the backup job abends during the second step (ANALYZE), the status of the backup mission remains BACKUP IN PROCESS. When this happens, reset the backup mission status to ENDED through the BKPRESET job in the Control-D JCL library. For more information on the BKPRESET utility, refer to the Control-D and Control-V utilities chapter of the *INCONTROL for z/OS Utilities Guide*.

If the backup mission ended NOTOK because one or more CDAM files were not backed up successfully, reorder the mission to back up only the CDAM files that were not backed up successfully during the previous run. Rerunning the same mission (without reordering it) reprocesses all CDAM files of the previous run including files that were successfully backed up.

## Changing the Backup Mission Retention Period

The following table describes the parameters used by backup missions to specify the retention period of a backed up CDAM file:

**Table 163 Parameters for Changing Backup Mission Retention Period**

| Parameter                | Description                                                                                                                 |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| # OF DAYS TO KEEP        | Specifies how many days must elapse from the backup date to the expiration date.                                            |
| # OF GENERATIONS TO KEEP | Specifies how many subsequent generations (executions) of the backup mission must be produced until the generation expires. |

You can specify either one (but not both) of these parameters in the backup mission definition screen. If you need to change from the # OF GENERATIONS TO KEEP method to the # OF DAYS TO KEEP method, use a new backup mission (that is, statement DO BACKUP in the decollation mission definition must refer to a new backup mission name). If the same backup mission is used, an error message is displayed and the backup mission ends NOTOK.

## Backup Mission Considerations

The organization of backup missions is performed according to the backup cycles used at the site. A backup mission must be defined for each backup cycle.

**Table 164 Backup Mission Cycle Example**

| Type     | Description             |
|----------|-------------------------|
| BCK0007D | Backup for one week     |
| BCK0014D | Backup for two weeks    |
| BCK0031D | Backup for one month    |
| BCK0091D | Backup for three months |
| BCK0365D | Backup for one year     |

Each backup mission archives on the same tape or cartridge all the reports assigned to it. The backup mission for archiving a report is selected in the job decollating parameters.

```

WHEN LINE 00001 - 00001 COL 00020 - 00080
  STRING ACCOUNTS RECEIVABLE - DAILY
DO ..
DO BACKUP=BCK0031D
WHEN LINE 00001 - 00001 COL 00020 - 00080
  STRING ACCOUNTS RECEIVABLE - BILLS
DO ..
DO BACKUP=BCK0007D

```

Different reports within the same job can be backed up for different retention periods.

The name of the backup mission is descriptive. The actual retention period is determined by parameter # OF DAYS/GENERATIONS TO KEEP in the backup mission. For example, backup mission BCK0031D can actually keep the reports on the tapes for 35 days.

Backup missions can be triggered based on the following:

- time (for example, 04:00 a.m.)
- automatic dependencies—when one or more specified jobs have been decollated
- manual dependencies—the operator can decide when to start the backup process
- a combination of the above

## Restore Mission Management

This section discusses the following topics:

- advanced scheduling issues
- restoring according to scheduling dates
- restore mission workflow
- exception handling
- restoring with the original backup utility

## Advanced Scheduling Issues

### Restoring According to Scheduling Dates

You can organize restore missions so that each day's restore management (that is, the restore workflow) is the same. The simplest method is to specify `DAYS=ALL` in the Basic Scheduling parameters of all restore missions. Once a day, when the New Day procedure is invoked, all restore missions scheduled for the next 24 hours are placed on the Active Missions file.

This restore organization does not maximize the capabilities of Control-D. You can organize the restore order in different ways for different days (for example, weekdays, weekends, end of the month, holidays).

Using Control-D, you can define several copies of the same restore mission. Each copy is an independent definition of the restore mission and can have different scheduling criteria, different runtime criteria, and so on.

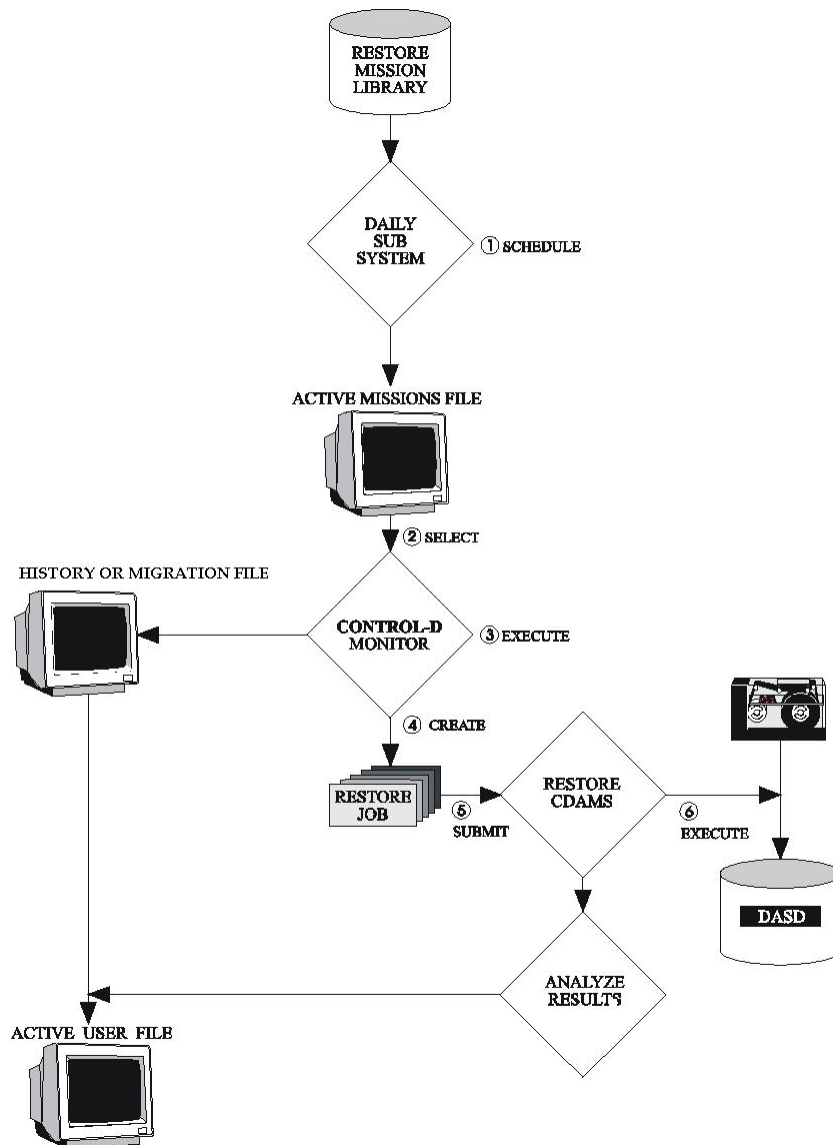
For example, the `RSTNOON` restore mission does not start later than 12:00 on every workday, does not start later than 11:00 at the end of the week, and is not scheduled for holidays.

Since there is no limit to the number of restore missions that can be defined, the user can organize the restore process to optimally suit every production day of the year.

## Restore Mission Workflow

The following figure illustrates the restore mission workflow of Control-D. It shows the stages involved from initially scheduling the restore mission through restoring the CDAM or Index datasets.

**Figure 57      Restore Mission Workflow**



The workflow of a restore mission is as follows:

- Restore is requested by online users through option R of the History or Migrated Report List screen. The History or Migrated User Report List file is scanned by the Control-D monitor for all reports that need to be restored by the specified restore mission name. (This is a fast scan, not a scan of the entire file.) The result of this process is a list of dataset names to be restored.
- The Control-D monitor reads a skeleton job from the library referenced by DD statement DADSKL of the Control-D monitor. The member name must be the same as the restore mission name (for example, RST0060M).

Since the same library is used for printing, migration, backup and restore mission skeletons, the names of the missions must be unique.

When you define a new restore mission, you must create a new skeleton job with the same name. The member must contain certain parameters that are interpreted by the Control-D monitor. The parameters are listed in the table below.

**Table 165 Parameters for New Restore Mission Skeleton Job**

| Parameter               | Description                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| %REPEAT%<br>%ENDREPEAT% | Beginning and end of a repeating step. Mandatory. Since outputs can be backed up on many volumes, it is sometimes necessary (with certain archiving products) to perform the restore by more than one step. The definition of this repeating step is found between the %REPEAT% and %ENDREPEAT% statements (not applicable to DF/HSM, DMS/OS, ASM2 or ARCS formats). |
| %DSNS%                  | Resolves into a list of all the dataset names that have to be restored. This list is in DF/DSS, DF/HSM, FDR, DMS/OS, ASM2, or ARCS format, depending on installation parameters. Mandatory.                                                                                                                                                                          |
| %VOLUMES%               | Resolves into the volume serial numbers of the tapes taking part in the restore. (Applies to DF/DSS or FDR formats.) Mandatory when non-cataloged backup data sets are used. Not recommended when backup data sets are cataloged.                                                                                                                                    |
| %TIMESTAMP%             | Resolves into a timestamp that is later used by Control-D for internal purposes. Mandatory.                                                                                                                                                                                                                                                                          |
| %MISSNAME%              | Resolves into the restore mission name. Mandatory.                                                                                                                                                                                                                                                                                                                   |
| %COND%<br>cond-name     | When the preparation of the restore job has been completed, the specified condition name is added to the IOA Conditions file. The ODAT of the condition is identical to the original scheduling date of the restore mission. This can be used for triggering the restore job under Control-M. Optional.                                                              |

| Parameter   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| %BKPUTIL%   | <p>Resolves to the backup utility name. Optional.</p> <p>The value of this parameter is determined as follows:</p> <ul style="list-style-type: none"> <li>▪ The value of BKPUTIL in the skeleton is assigned as the utility name. For example, BKPUTIL=HSM.</li> <li>▪ If BKPUTIL is not set in the skeleton member, the Backup utility name is taken from the BKPUTIL installation parameter in the CTDPARM member of the IOA PARM library,</li> </ul> <p>or</p> <p>When restoring migrated reports, the Backup utility name is CTVMIG.</p> <p>In all the sample skeleton members provided in the Control-D SKL library, the appropriate backup utility name is already assigned to parameter BKPUTIL.</p> <p>For details about how to use this parameter, see <a href="#">Restoring With the Original Backup Utility</a> (on page 496).</p> |
| %MEDIANAME% | <p>This parameter is used only in the skeleton restoring migrated reports. Resolves into the name of the media to which the reports are migrated. If reports to be restored have been migrated to different media, several Restore steps with different media names will be created in the job.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| %ODATE%     | <p>Resolves into D<math>yymmdd</math>, where <math>yymmdd</math> represents the ODATE of the backup mission that backed up the report. Optional.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| %TIME%      | <p>Resolves into T<math>hhmmss</math>, where <math>hhmmss</math> represents the start time of the backup mission that backed up the report. Optional.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| %DUMMY%     | <p>Intended for Control-D internal use. Do not change.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| %ANALYZE%   | <p>Intended for Control-D internal use. Do not change.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

- When Control-D finishes preparing the member for submission, control is passed to User Exit CTDX011. This exit can modify the contents of the submitted job by adding, deleting or modifying the JCL. For example, the dataset names list can have a format different from the DF/DSS, DF/HSM, FDR, DMS/OS, ASM2 or ARCS format. The exit can return the following return codes:

**Table 166 Return Codes for Exit CTDX011**

| Code | Description                                                                                                 |
|------|-------------------------------------------------------------------------------------------------------------|
| 0    | Submit the job.                                                                                             |
| 4    | Do not submit the job (normally used when the submission is to be executed by a production control system). |

- The member is written to the library referenced by DD statement DADJOB of the Control-D monitor, with a name identical to the name of the restore mission. Therefore, this library must be different from the library referenced by DD statement DADSKL. Depending on the return codes from the user exit, the job is, or is not, submitted. If Control-M is installed, submission of the job can be triggered by the %COND% statement. (The advantage is that overall production tape workload and tape usage priority are taken into consideration when submitting the restore job.)

The original member supplied is divided into

- the DF/DSS, DF/HSM, FDR, DMS/OS, ASM2 or ARCS restore utility or CTVUMG utility by restoring migrated reports.  
A step is created for each group of tapes (volsers) containing reports to be restored (not with all products). By restoring migrated reports, a step is created for each migration media.
- a program that analyzes the output of the restore process and updates Control-D with the results  
This step copies the restored user and report entries from the History or Migrated User Report List file to the Active User Report List file and indicates that a restore has been performed.
- If a CDAM or Index file to be restored already exists on disk, that file is not restored to disk. If all the files to be restored already exist on disk, the restore mission creates a restore job that performs only the ANALYZE step. This step copies user and sysdata records from the History or Migrated User Report List file to the Active User file and ends OK.
- When the job finishes executing, the Control-D monitor is notified (by the second step) and the restore mission's post-processing parameters (OUT and SHOUT) are processed.

## Exception Handling

If the restore job abends in one of the first steps (such as the RESTORE step), rerun the job (enter the job in the Control-D JCL library and submit it or, if scheduled under Control-M, use the Control-M rerun option without restart).

If the restore job abends in the last step (ANALYZE), rerun the job from the last step (that is, submit it again without restart).

If the last step abends, the status of the restore mission remains RESTORE IN PROCESS. To reset the restore mission status to ENDED, run the RSTRESET job from the Control-D JCL library. This resets the restore mission. In addition, perform all the restore requests again (using option R in the History or Migration User Report List of Screen U). The restore mission finishes with ENDED NOTOK status.

For more information on the RSTRESET utility, refer to the Control-D and Control-V utilities chapter of the *INCONTROL for z/OS Utilities Guide*.

## Restoring With the Original Backup Utility

Sites that are moving from one backup utility to another (for example, from FDR to DF/HSM) may end up having CDAM or Index files that are backed up by different backup utilities. Each of the backed up CDAM or Index files must be restored using the original backup utility.

To restore the CDAM or Index file with the appropriate backup utility, the restore mission name must point to a skeleton member of the original backup utility. Parameter BKPUTIL in the skeleton member must be set to the original backup utility name.

---

```
// *      BKPUTIL=FDRCAT
```

---

This statement must be in the skeleton member to use the FDR backup utility regardless of the value specified for BKPUTIL in member CTDPARM in the IOA PARM library.

The BKPUTIL value in the backup skeleton overrides the value of installation parameter BKPUTIL in member CTDPARM in the IOA PARM library.

## Migration Mission Management (Control-V Only)

This section discusses the following topics:

- migrating reports
- multi-stage migration
- migration mission—report correspondence
- mig and msm migration types
- scheduling criteria
- primary and secondary migration
- migration mission skeleton jobs
- target media types
  - migration to cartridge (CART)
  - migration to ROSs/OSS
  - migration to FileTek storage machine
  - migration to OAM
  - migration to disk, fat-DASD, and IBM 3995 optical library dataserver (in 3390 emulation mode)
- naming conventions
  - CDAM datasets
  - indexes
- migration mission workflow
- example: multi-stage migration mission workflow
- exception handling



## Migrating Reports

Migration missions control the migration of Compressed Dataset Access Method (CDAM) reports and their indexes from one media (optical disk, cartridge, DASD, and so on) to another. They enable you to move data between fast access, higher cost media and slower access, lower cost media according to need. All user-defined parameters are specified in the Migration Mission Definition screen.

For information about defining indexes and migration missions, see the chapter about decollating mission parameters in the *Control-D and Control-V User Guide*.

For information about CDAM files and migrated CDAM datasets, see the CDAM chapter in the *Control-D and Control-V User Guide*.

## Multistage Migration

A maximum of 10 migration stages can be defined as a migration path in each migration mission. Single-stage migration can be defined for reports whose remigration is not required.

Each migration stage specifies the target media, the age of the report in days when migration must occur, the cyclic time interval in days between refresh operations (when the report migrates to a new physical media of the same type), the prefix value (for migration to DASD and ROSS/OSS), and the FSET and VSET values (for migration to FileTek).

## Migration Mission - Report Correspondence

The migration mission name is specified in the DO MIGRATE statement of a report's decollation mission. A report retains its original migration mission name for its entire lifetime. Each migration mission defines all stages in the migration path for all reports whose decollation mission contains a DO MIGRATE statement specifying that migration mission's name.

The user can modify the migration path and other parameters in a migration mission at any time. When a migration mission is modified, the migration of all reports whose decollation mission specifies that migration mission's name are affected by the modification.

The retention period of each report is stored with the report. If the retention period of all reports previously migrated by a migration mission must be changed uniformly, modify parameter RETENTION DAYS in that migration mission and set parameter FORCE to Y (Yes). This causes \$SYSDATA records created by previous runs of this migration mission to be updated with the new retention period during the next run of the modified migration mission. If parameter FORCE is not set to Y, only subsequently migrated reports receive the new retention period.

If the retention period of the previously migrated reports must be selectively changed, use utility CTDUPBKP.

Specify only one migration mission for each report. If more than one migration mission is specified in the decollation mission definition, a report's files are migrated by that migration mission whose name is first encountered in the decollation process. Warning messages are generated if all CDAM files associated with a report do not have the same migration mission name.

If the decollation process detects more than one migration mission name, a warning is issued to the IOA Log file and the decollation process terminates with a status of ENDED OK – WITH WARNINGS.

If \$SYSDATA records created by different decollation missions for the same report contain more than one migration mission name, a warning is issued by utility CTDDLRP.

## MIG and MSM Migration Types

Initial migration from DASD by the first stage (stage 01) in a migration path is called "MIG" migration. All subsequent migrations in the migration path are called "MSM" (multi-stage) migration. The migration type (MIG or MSM) is displayed in the TYP field of the Active Missions screen.

## Scheduling Criteria

Separate scheduling criteria are specified for the two migration types.

- MIG scheduling criteria are specified under STAGE 01 SCHEDULING PARAMETERS in the Migration Mission Definition screen. At most sites, stage 01 migration is scheduled frequently, perhaps daily, to remove reports from scarce DASD resources as soon as possible.
- MSM scheduling criteria are specified under MIGRATION PATH SCHEDULING PARAMETERS in the Migration Mission Definition screen. At most sites, subsequent stages in the migration path are scheduled less frequently, perhaps every weekend, to minimize the extent to which running migration jobs impacts production jobs.

To minimize DASD utilization, schedule stage 01 (MIG type) migrations more frequently. To minimize the usage of computer resources when such resources are required for other jobs, schedule other (MSM type) migrations less frequently.

## Primary and Secondary Migration

Each migration stage can contain a primary migration specification and, optionally, a secondary migration specification. Secondary migration produces a copy of primary migration reports (usually on less expensive media) that can be accessed if primary migration reports become damaged.

If SECONDARY MEDIA is specified in a migration mission, the migration mission submits the following migration jobs:

- The primary migration job uses the migration skeleton. For more information, see [Migration Mission Skeleton Jobs](#) (on page 499) whose name is identical to the migration mission name.
- The secondary migration job uses the migration skeleton whose name is specified in parameter SECONDARY SKELETON. This parameter defaults to the name of the primary migration mission, modified by changing the 3rd character to C (or to D if it had been C).

Only files designated as primary migration files can be accessed for viewing. If primary migration files are not usable for any reason, utility CTDUPBKP can be run to switch the primary and secondary migration designations. After running this utility, the secondary migration files are accessed for viewing. This utility can be run again to switch back to viewing primary migration files. The next Multi-Stage Migration mission automatically recreates the primary migration files on the (originally) defined media.

Information about retention and about the current primary migration media can be displayed in \$SYSDATA long format by using option A (Additional Info) in the Migrated Report list. Information about secondary migration media can be retrieved by running utility CTDUPBKP with parameter SIMULATE set to YES. For utility CTDUPBKP documentation, see the *INCONTROL for z/OS Utilities Guide*.

Secondary migration files are deleted when the next secondary migration is completed and at the end of the retention period. Refresh operations are performed independently for primary and secondary media.

## Migration Mission Skeleton Jobs

Every primary and secondary migration mission must have its own skeleton job in a separate member of the Control-D SKL library. The name of the member containing the skeleton job for a primary migration mission must be identical to the name of the migration mission. The name of the member containing the skeleton job for the secondary migration mission can be specified in parameter SECONDARY SKELETON in the migration mission.

In the Control-D SKL library, member MIGLIM contains a skeleton job for a primary migration mission. Member MICLIM contains an almost identical skeleton job for a secondary migration mission. These skeleton jobs can be used "as is" (for migration missions MIGLIM and MICLIM) and can be duplicated (and modified) as required for other migration missions.

Because the same library is used for printing, backup, restore and migration mission skeletons, the names of all missions must be unique.

When defining a new migration mission, create a skeleton job member with the same name. To implement secondary migration, create a skeleton job member with the name in parameter SECONDARY SKELETON. The skeleton job format is identical for migration to all media types.

Skeleton jobs contain the parameters listed below. These parameters are interpreted (resolved) by the Control-D and Control-V monitor. All parameters (except %COND%) are mandatory and must remain exactly as written in the MIGLIM and MICLIM skeleton jobs.

**Table 167 Parameters for Skeleton Jobs**

| Parameter              | Description                                                                                                                                                                                                                                                                                                             |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| %KODAK% / %ENDKODAK%   | Labels that enclose a part of the skeleton job that is placed in the migration job only when the target media is ROSS/OSS.                                                                                                                                                                                              |
| %REPEAT% / %ENDREPEAT% | Labels that enclose a part of the skeleton job that is repeated for every target media by Control-D and Control-V.                                                                                                                                                                                                      |
| %TARMEDIA%             | Name of the target media to which files are migrated. The value is specified in the migration mission definition.                                                                                                                                                                                                       |
| %MIGPREF%              | Prefix of the volume or platter to which files are migrated. If a value is not specified in the migration mission definition, NOCHECK is added to the job and the prefix is not checked. Optional.                                                                                                                      |
| %LEVEL%                | For a migration mission with both primary and secondary migration, resolves to PRIMARY and SECONDARY in the appropriate jobs. For only primary migration, resolves to PRIMARY in step MIG and PRIMONLY in step ANALYZE. For only secondary migration, resolves to SECONDARY in step MIG and SECREFRESH in step ANALYZE. |
| %MISSNAME%             | Migration mission name.                                                                                                                                                                                                                                                                                                 |
| %TIMESTAMP%            | Timestamp that is later used by Control-V for internal purposes.                                                                                                                                                                                                                                                        |

| Parameter        | Description                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| %VSET% / %FSET%  | VSET (volume set) and FSET (file set) parameters specified in the migration mission definition. These parameters are used only for migration to FileTek. For other target media, these parameters and DD statement FTKIN are not included in the migration job.                                                                                                                 |
| %DSNS%           | List of datasets to be migrated by this mission. The Control-D and Control-V monitor obtains these values by scanning \$SYSDATA records.                                                                                                                                                                                                                                        |
| %COND% condition | Prerequisite condition to be added to the IOA Conditions file when preparation of the migration job is completed. The condition is specified in parameter OUT of the migration mission. The ODAT of the condition is identical to the original scheduling date of the migration mission. This mechanism can be used for triggering the migration job under Control-M. Optional. |

## Sample Skeleton Job

Skeleton job MIGLIM for primary migration is listed below. Skeleton job MICLIM for secondary migration is identical except the DSN suffix in DD statement SYSPRINT is S instead of P.

The labels %KODAK% and %ENDKODAK% enclose a part of the skeleton job that is placed in the migration job only when the target media is ROSs/OSS. (When the target media is not ROSs/OSS, nothing is inserted between these labels.)

```

//I900INMG JOB , IOA900, MSGCLASS=X, CLASS=A,
// PERFORM=1
//*
%KODAK%
%ENDKODAK%
%REPEAT%
//MI GRAT EXEC PGM=CTVMIG, PARM=' %TARMEDIA%, %MIGPREF%, %LEVEL%'
//STEPLIB DD DISP=SHR, DSN=IOAP. V900. LOAD
//DATRACE DD DUMMY
//ERRLOG DD SYSOUT=*, HOLD=YES
//DALOG DD DISP=SHR, DSN=IOAP. V900. LOG
//DAMIG DD DISP=SHR,
// DSN=CTDP. V900. MIG. E000
//DAMIGI DD DISP=SHR,
// DSN=CTDP. V900. MIGI. E000
//SYSPRINT DD DSN=CTVP. V900. %MISSNAME%. MIGLIST. P,
// DISP=(MOD, PASS, CATLG), SPACE=(CYL, (1, 1)), UNIT=SYSALLDA
//SORTOUT DD SYSOUT=*, HOLD=YES
//SORTWK01 DD UNIT=SYSALLDA, SPACE=(CYL, (20, 40))
//SYSOUT DD SYSOUT=*, HOLD=YES
//FTKIN DD *
VSET=%VSET%
FSET=%FSET%
//SYSIN DD *
%DSNS%
/*
%ENDREPEAT%
//*****
//* CONTROL- D ANALYZE STEP *
//* ----- *
//*****
//ANALYZE EXEC PGM=CTDBKC, COND=EVEN, REGION=4096K,
// PARM=' %TIMESTMP%, %MISSNAME%'
//STEPLIB DD DSN=IOAP. V900. TLOAD, DISP=SHR
// DD DSN=IOAP. V900. LOAD, DISP=SHR
//TAPE DD DUMMY
//SYSIN DD DSN=CTVP. V900. %MISSNAME%. MIGLIST. P,
// DISP=(OLD, DELETE, CATLG)
//DAAMF DD DISP=SHR,
// DSN=CTDP. V900. AMF
//DAAMF1 DD DISP=SHR,
// DSN=CTDP. V900. AMF
//DALOG DD DISP=SHR,
// DSN=IOAP. V900. LOG

```

```
//DAACT DD DISP=SHR,
//      DSN=CTDP.V900.ACT.E000
//DAACTI DD DISP=SHR,
//      DSN=CTDP.V900.ACTI.E000
//DAMIG DD DISP=SHR,
//      DSN=CTDP.V900.MIG.E000
//DAMIGI DD DISP=SHR,
//      DSN=CTDP.V900.MIGI.E000
//SYSPRINT DD SYSOUT=*, HOLD=YES
//SYSABEND DD SYSOUT=*, HOLD=YES
//DATRACE DD SYSOUT=*, HOLD=YES
//
```

## Target Media Types

The following table describes the supported migration target media types:

**Table 168 Migration Target Media Types**

| Type    | Description                                                                                                |
|---------|------------------------------------------------------------------------------------------------------------|
| CART    | 3490/3490E/3590 Tape Cartridge                                                                             |
| DASD    | Disks (3380, 3390, Fat-DASD 3390-9, IBM 3995 Optical Library Dataserver in 3390 emulation mode, and so on) |
| OSS     | DataWare/ROSS/OSS or compatible                                                                            |
| FTK     | FileTek Storage Machine (SM)                                                                               |
| OAM     | IBM Object Access Method                                                                                   |
| CENTERA | EMC Centera Storage System                                                                                 |

Each site can use any or all of the supported types of migration target media. Media-specific parameters (NAME, TYPE, DSNPREF, UNITNAME, DEVADDR, and so on) must be defined in the IOASPRM member in the IOA PARM for each target media type (including DASD) that is used.

For details about these parameters, see the Control-V chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

For more information about the supported media types, see [Device Definition and Usage](#) (on page 526).

## Migration to Cartridge (CART)

When migrating to media type CART, the migration mission places as many files as possible on the same volume. Any space remaining is used by a subsequent run of the same migration mission. When insufficient space remains, a scratch volume is used.

Before writing each file, the migration process determines if the file fits on the volume (based on the CART media capacity parameter CARTLEN specified in the IOASPRM member). If the file does not fit, a new scratch volume is used. If the file is larger than the specified volume capacity, the migration process uses a new volume for that file and then uses as many volumes (not exceeding five) as needed.

Miscalculating the remaining space (because the specific volume was smaller or the compression factor was lower than expected) can cause the file to span more than one volume. This can result in slower retrieval response time.

## Migration Without Cataloging

By default, all migrated CDAM and Index files are cataloged, however, you can migrate these files to cartridge without cataloging them. When you use this option, the DEVICE\_TYPE and VOLSER file parameters, as well as the file sequence number, are kept in the Control-D database instead of in the System catalog. This option is available for files that are migrated to one or two volumes only.

To activate this option, specify N in the CTLG field of the media line in the Migration Mission Definition screen. Large files migrated to more than two volumes will be cataloged even if this option is activated.

Using this option requires that

- when running the CTVCLMIG utility, the value of the TAPELIST parameter is set to YES to produce the list of expired cartridges for the Tape Management System.
- once this option has been used, you can only use Control-V multistage migration to move the migrated files from one volume to another. You must not move the migrated files from one volume to another outside of Control-V.

## Migration to ROSS/OSS

The EXEC statement in the OSS migration skeleton's SRVD step contains PARM='OSS'. Change OSS to the logical name of the target media specified in the IOASPRM member in the PARM library.

It is recommended that you specify a set of platters to which reports (and indexes) must migrate. Use meaningful prefixes to create sets of platters containing reports with similar characteristics (for example, viewed together, viewed with similar frequencies, viewed by the same group of users). If you do not specify a prefix in the migration mission, the report migrates to the first available platter.

The user defines ROSS/OSS platters and the VOLSERS on each platter. The platter prefix in a migration mission resolves to the value specified in parameter PREFIX of the Migration Mission Definition screen. This platter prefix enables the migration process to select the desired platter.

After selecting a platter, the migration process scans the VOLSER list and selects the first completely empty VOLSER in the list. CDAM files migrate sequentially until this VOLSER is filled (to a maximum of 32K blocks on any volume). "Virtual" VOLSERS that are not filled in one migration mission are left partially empty, but no physical platter space is wasted.

When a file is written on a VOLSER on the ROSS/OSS, it is cataloged on that VOLSER with the specific label number. The VOLSER of each migrated report is stored both on the catalog and in the Control-V Migrated User Report file. When the report is viewed, this catalog entry enables the ROSS/OSS to access the needed platter and read the required VOLSER. When all VOLSERS on a specific platter are no longer needed, the user can destroy the platter.

## Migration to Disk, Fat-DASD, and IBM 3995 Optical Library Dataserver (in 3390 Emulation Mode)

It is recommended that you specify the prefix of a set of VOLSERS to which the reports must migrate. Use meaningful prefixes to create sets of volumes containing reports with similar characteristics (for example, viewed together, viewed with similar frequencies, viewed by the same group of users). If you do not specify a prefix in the migration mission, the report migrates to the first available VOLSER that belongs to the mainframe UNIT specified in the media definition.

## Migration to FileTek Storage Machine

The following table describes the parameters that must be specified when the target media is a FileTek Storage Machine:

**Table 169 Mandatory Parameters for FileTek Storage Machine Target Media**

| Parameter | Description                                                             |
|-----------|-------------------------------------------------------------------------|
| VSET      | Volume set of the storage machine to be used for the migration mission. |
| FSET      | File set of the storage machine to be used for the migration mission.   |

If you do not specify these parameters, the default VSET and FSET for the FileTek user ID specified in the IOASPRM member in the PARM library is used.

For information on determining the Volume set and File set, see the FileTek Storage Machine documentation.

If separate VSET and FSET values need to be specified for different groups of users, define a separate migration mission for each group.

## Migration to OAM

During the migration process, the Control-V migration program interfaces with the IBM OAM through the OSREQ application interface to store the report as OBJECTs in a COLLECTION. The size of the OBJECTs are determined by media specific parameters defined in the IOASPRM member.

Migration to OAM enables you to migrate many CDAM and Index files into a single OAM collection. This reduces the number of entries in the system catalog and improves system performance.

The SMS management system, guided by the user's definition in an ACS routine, directs the data server to transport the collection of OAM objects to a 3995 device. The user cannot specify parameters to SMS through Control-V. Therefore, all parameters for SMS must be specified externally.



**Figure 59 Migration to OAM**

The image shows the 'SWPU30 Properties' dialog box with the 'General' tab selected. The 'Name' field contains 'SW 1.3'. The 'Link Service' dropdown is set to 'SnoDlc1'. The 'Comment' field contains 'TR via 3172'. Under 'Remote End', 'Host System' is selected. Under 'Allowed Directions', 'Both Directions' is selected. Under 'Activation', 'On Server Startup' is selected. The 'Passthrough via Connection' dropdown is set to '<None>'. The checkbox 'Supports Dynamic Remote APPC LU Definition' is unchecked. At the bottom are 'OK', 'Cancel', and 'Help' buttons.

## Migration to Centera

The EMC Centera storage system is used for report migration. During the migration process, each CDAM file is put into separate Centera clips as a BLOB and the clip-id is stored in SYSDATA records for later access. Centera node addresses are taken from the POOL1 through POOL4 parameters of the corresponding media, as defined in IOASPRM.

Because the Centera SDK works over TCP/IP, all address spaces using the SDK (migration jobs, IOASMON, CTVCMLMIG utilities, and CTVUNMIG) should run under an RACF user with defined OMVS segment.

You must be running z/OS 1.2 or higher when using Centera SDK in the migration process.

In order to use Centera authorization based on the PEA profiles, perform the following steps:

1. Allocate a file with attributes RECFM=VB, LRECL=1024, BLKSIZE=4096 and insert the Centera PEA text in ASCII. The text should be transferred to the mainframe in binary format. For example, the file DS name is CTD.CENTPEA.
2. Create the CENTCONF member in the IOA PARM library with the following content:  
`CENTERA_PEA_LOCATION=// 'CTD.CENTPEA'`  
 X'00' must be specified after the last apostrophe.
3. Add the following DD card to the migration skeleton and to the IOASMON, CTVCMLMIG, and CTVUNMIG procedures:

```
//FPCONFIG DD DISP=SHR,DSN=&ILPREFA..PARM(CENTCONF)
```

If Centera authorization fails, the job or STC receives an error code of -10153. For example:

IOA5E4E CENTERA INIT ERROR: RC=0008, REASON CODE=-10153

## Naming Conventions

### CDAM Datasets

A primary migrated CDAM dataset conforms to the following naming convention:

`pmigpref.jobname.jobid.datetime.fileid`

where `pmigpref` is the file name prefix. Based on the length of the DSNPREF parameter in the IOASPRM member in the IOA.PARM library, which should be the same as the length of the IXHPREF parameter in the CTVPARM member, the file name prefix structure can be built in one of the following ways:

- If DSNPREF is three characters long, `pmigpref` is built as DSNPREF.PREFIX, where PREFIX is the original CDAM prefix.
- If DSNPREF is one or two characters long, `pmigpref` is built by inserting the first DSNPREF character into the original index file prefix.
  - If DSNPREF is one character, it is inserted into the first position.

For example, if DSNPREF=M and the original CDAM file prefix is CTDP.L2, `pmigpref` is MCTDP.L2.

- If DSNPREF is two characters long, the second character is an integer from 1 to 7, representing the number of the position into which the first DSNPREF character is inserted.

For example, if DSNPREF=M6 and the original CDAM file prefix is CTDP.L2, `pmigpref` is CTDP.ML2.

A secondary migrated CDAM dataset conforms to the following naming convention:

`smigpref.jobname.jobid.datetime.fileid`

where `smigpref` is the file name prefix. Based on the length of the SECPREF parameter in the IOASPRM member in the IOA.PARM library, which should be the same as the length of the IXHPREF parameter in the CTVPARM member, the file name prefix structure can be built in one of the following ways:

- If SECPREF is three characters long, `smigpref` is built as SECPREF.PREFIX, where PREFIX is the original CDAM prefix.
- If SECPREF is one or two characters long, `smigpref` is built by inserting the first SECPREF character into the original index file prefix, using the same method as `pmigpref` is built from DSNPREF.

For example, if SECPREF=S and the original CDAM file prefix is CTDP.L2, `smigpref` is SCTDP.L2. If SECPREF=S6 and the original index file prefix is CTDP.L2, `smigxpref` is CTDP.SL2.

The other qualifiers are copied from the original CDAM dataset name. For more information, see the CDAM chapter in the *Control-D and Control-V User Guide*.

For both primary and secondary migration, the `datetime` field has the following format:

`datetime`

This field is a Control-V generated timestamp. When a CDAM dataset migrates from disk to the level 01 target media, this field remains prefixed by the letter D. This letter is replaced by the next letter in alphabetical sequence during each stage of the multistage migration or refresh.

## Indexes

An index file conforms to the following naming convention:

```
indpref.jobname.date.time.fileid
```

where `indpref` is the index file prefix.

Based on the length of the `IXHPREF` parameter in the `CTVPARM` member in the `IOA.PARM` library, the index file name prefix structure can be built in one of the following ways:

- If `IXHPREF` is three characters long, `indpref` has following structure:

```
ixhpref.ixpref
```

where

`ixhpref` is the 3-character first level qualifier prefix specified in the `IXHPREF` parameter. All indexes have the same `IXHPREF` value.

`ixpref` is the second level prefix specified in the `IXPREF` parameter in the `CTVPARM` member of the `IOA.PARM` library. All indexes have the same `IXPREF` value.

- If `IXHPREF` is one or two characters long, `indpref` takes the value of the `CDAM` file prefix with one of the characters replaced to the value specified in first character of `IXHPREF`. Parameter `IXPREF` from `CTVPARM` is not used in this case.

- If `IXHPREF` is one character, the first character of the `CDAM` prefix is replaced.

For example, if `IXHPREF=I` and the `CDAM` file prefix is `CTDP.L2`, `indpref` is `ITDP.L2`.

- If `IXHPREF` is two characters, the second character is a digit from 1 to 7 and it means the position number of the character which is replaced.

For example, if `IXHPREF=I6` and the `CDAM` file prefix is `CTDP.L2`, `indpref` is `CTDP.L2`.

`date` is the letter `C` followed by the 5-character date in the julian format, `YYDDD`.

`time` is the letter `T` followed by 6 characters indicating the time in `hhmmss` format.

`fileid` is the file ID beginning with the letter `M`, followed by one digit (from 1 to 9) that indicates the number of the monitor that created the index, followed by the 3-digit sequential number of the index produced in the decollation mission.

A primary migrated index conforms to the following naming convention:

```
pmigxpref.jobname.date.time.fileid
```

where `pmigxpref` is the file name prefix. Based on the length of the `DSNPREF` parameter in the `IOASPRM` member in the `IOA.PARM` library, which should be the same as the length of the `IXHPREF` parameter in the `CTVPARM` member.

The index file name prefix structure can be built in one of the following ways:

- If `DSNPREF` is three characters long, `pmigxpref` is built as `DSNPREF.IXPREF`, where `IXPREF` is the second level prefix specified in the `IXPREF` parameter in the `CTVPARM` member.
- If `DSNPREF` is one or two characters long, `pmigxpref` is built by inserting the first `DSNPREF` character into the original Index file prefix.
  - If `DSNPREF` is one character, it is inserted into the first position.

For example, if DSNPREF=M and the original Index file prefix is ITDP.L2, pmigxpref is MITDP.L2.

- If DSNPREF is two characters, the second character is a digit from 1 to 7 and it means the number of position into which the first DSNPREF character is inserted.

For example if DSNPREF=M6 and the original Index file prefix is CTDP.I2, pmigxpref is CTDP.MI2.

A secondary migrated index conforms to the following naming convention:

smigxpref.jobname.date.time.fileid

where smigxpref is the file name prefix. Based on the length of the SECPREF parameter in the IOASPRM member in the IOA.PARM library, which should be the same as the length of the IXHPREF parameter in the CTVPARM member, the file name prefix structure can be built in one of the following ways:

- If SECPREF is three characters long, smigxpref is built as SECPREF.IXPREF, where IXPREF is the second level prefix specified in the IXPREF parameter in the CTVPARM member.
- If SECPREF is one or two characters long, smigxpref is built by inserting the first SECPREF character into the original Index file prefix by the same way as pmigxpref is built from DSNPREF.

For example, if SECPREF=S and the original Index file prefix is ITDP.L2, smigxpref is SITDP.L2; if SECPREF =S6 and the original Index file prefix is CTDP.I2, smigxpref is CTDP.SI2

For both primary and secondary migration, the date field has the following format:

date

When an index migrates from disk to the level 01 target media, this field remains prefixed by the letter C. This letter is replaced by the next letter in alphabetical sequence during each stage of the multistage migration or refresh.

The other qualifiers are copied from the original index name.

## OAM Collections and Objects

The naming structure of OAM Collections and Objects depends on the status of optional Wish WV0390.

- If optional Wish WV0390 is not applied
  - each CDAM or Index file is migrated into a separate OAM collection.
  - collection names are built the same way as the migrated CDAM or Index file names, as described in [CDAM Datasets](#) (on page 506) and [Indexes](#) (on page 507).
  - object names conform to following naming convention:  
CTV.Nx.Nxxxxxxx  
where CTV, N, and N are constants, and xxxxxxxx is the serial number of the object inside the collection.
- If optional Wish WV0390 is applied
  - many CDAM and Index files are migrated into the same OAM collection.
  - the collection name conforms to following naming convention:  
colpref.migmis.Nxxxxxxx

where

- colpref is the collection name prefix. Based on the length of the DSNPREF parameter (for primary migration) or the SECPREF parameter (for secondary migration) in the IOASPRM member in the IOA.PARM library, the collection name prefix structure can be built in one of the following ways:
- If the parameter is three characters long, colpref is DSNPREF for primary migration or SECPREF for secondary migration.
- If DSNPREF (or SECPREF for secondary migration) is one or two characters long, colpref is built by concatenating the DSNPREF (or SECPREF for secondary migration) character with the constant CTVOAM.
  - migmis is name of the migration mission that migrates files to this collection.
  - Nxxxxxxx is the serial number of the collection inside of the migmis migration mission.
- The object name conforms to following naming convention:

`migfname.Nxxxx`

where

- migfname is built as follows:
- For migrated CDAM files migfname is built from the original CDAM file name by excluding the fifth qualifier, STEP#, from the name.
- For migrated index files, if IXHPREF is three characters long, migfname is built from the original index file name by excluding the first qualifier, IXHPREF, from the name.
- For migrated index files, if IXHPREF is one or two characters long, migfname is equal to the original index file name.
  - Nxxxx is the letter N followed by the serial number of the object inside the migrated file.

## Migration Mission Workflow

A migration mission consists of the following steps:

- Ordering one migration mission adds a MIG mission to the Active Missions file (if its scheduling criteria are satisfied) and adds a MSM mission to the Active Missions file (if its scheduling criteria are satisfied). The MIG mission migrates reports from DASD to the stage 01 target media. The MSM mission migrates reports from the media on which they currently reside (stage n-1) to the target media of stage n.
- If MIG and MSM missions with the same name exist concurrently, the status of both missions is "IN PROCESS" but the Control-D and Control-V monitor ensures that job MSM is not created and submitted before job MIG ends.
- The MIG mission scans \$SYSDATA records in the Active User file and the MSM mission scans \$SYSDATA records in the Migrated User file to find records for all reports that need to be migrated by the migration mission. This process produces a list of datasets to migrate.
- The Control-D and Control-V monitor looks for the primary migration skeleton job in the library referenced by DD statement DADSKL of the Control-D and Control-V monitor. The member name must be the same as the primary migration mission name (for example, MIG0007Y).
- If secondary media values are specified in a migration mission stage, the Control-D and Control-V monitor looks for the secondary migration skeleton job in the library referenced by DD statement DADSKL of the Control-D and Control-V monitor. The member name must be the same as the secondary migration mission name specified in parameter SECONDARY NAME in the Migration Mission Definition screen.
- Primary and secondary migration skeletons are tailored to produce jobs that perform the appropriate migrations and analyze the results. For MSM, the MIGRAT step is automatically duplicated for each migration stage that must be included in the migration job.
- The age of each report is calculated by subtracting the ODATE of its decollation mission from the ODATE of the migration mission that controls its migration. This calculation method permits testing whether a report will migrate on a future date, by specifying that date in the migration mission's ODATE parameter. (An installation parameter enables calculating the age of each report by subtracting the ODATE of its decollation mission from the current installation date. This calculation method does not permit such testing.)
- If a report does not currently reside on the media specified for its age (as calculated in the previous step), it is migrated to the specified media by the migration mission. If a report migrated by a migration stage has resided on a media for the number of days specified in parameter REFRESH EVERY for that stage, the media is refreshed by the migration mission.

When the migration job is ready for submission, control is passed to User Exit CTDX010. This exit can add, delete or modify JCL statements in the job. Exit CTDX010 returns one of the following return codes:

- 0 – submit the job
- 4 – do not submit the job

This return code is normally used when the job must be submitted by Control-M or another production control system.

- The migration job JCL is written to the library referenced by DD statement DADJOB of the Control-D and Control-V monitor with a name identical to the name of the migration mission. Therefore, this library must not be the skeleton library referenced by DD statement DADSKL.
- If %COND% is specified in the migration skeleton, the resolved condition is added to the IOA Conditions file. Depending on the return code from User Exit CTDX010, the job is or is not submitted. If Control-M is installed, submission of the job can be triggered by the condition added by a %COND% statement.
- If the migration target media is OSS (DataWare/ROSS/OSS or compatible), the migration job begins with step SRVD, which releases an OSS device, and step OSSDBEXT, which creates the OSS Extract Dataset using information from the OSS Database.
- The migration process creates and/or updates \$SYSDATA records in the Migrated User file with target media, target prefix, timestamp, and other migration parameters for both primary and secondary migration. All \$SYSDATA records pointing to a migrated report are updated with the new migration information.
- For migration stages whose target media is CART, Control-V records the VOLSER of the last used tape. This enables the next invocation of that migration mission to use the same tape.
- The original copy of each report that expires or moves to another physical media is marked for deletion. Actual deletion is performed during the next run of utility CTVCLMIG. This utility must be run periodically.
- When the job finishes executing, the Control-D and Control-V monitor is notified by the ANALYZE step and the migration mission's post-processing parameters (OUT and SHOUT) are processed.

Example: Multi-stage Migration Mission Workflow

The cumulative retention period for reports in this example is 8 years.

**Table 170 Multi-stage Migration Mission Workflow Example**

| Stage              | Decollating Mission                                                              |                                                                                           |
|--------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Report Processing  | Every workday, CDAM reports and indexes are stored on DASD for 1 month.          |                                                                                           |
|                    | Primary Migration                                                                | Secondary Migration                                                                       |
| Stage 01 Migration | Every weekend, 5 reports and indexes migrate from DASD to Optical for 11 months. | Every weekend, 5 reports and indexes migrate from DASD to CART for 7 years and 11 months. |
|                    | Optical media is refreshed every 6 months.                                       | CART media is refreshed every 4 years.                                                    |

| Stage              | Decollating Mission                                                                                                                                       |  |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Stage 02 Migration | Every month, reports and indexes that have attained age 12 months migrate from Optical to CART for 7 years.<br><br>CART media is refreshed every 4 years. |  |

The following figure illustrates an Optical media that is refreshed after six months and a CART media that is refreshed after 4 years. This multi-stage migration mission is specified in the migration mission definition.

**Figure 60 Multi-stage Migration Mission Workflow**

The screenshot shows the 'SWPU30 Properties' dialog box with the 'System Identification' tab selected. The '802.2 DLC' sub-tab is also active. The dialog is divided into several sections for configuring network and system parameters.

**General / System Identification / 802.2 DLC**

**Local Node Name:**

- Network Name: (L1 L4)
- Control Point Name: CP5WPU30
- Local Node ID: 04A 00515

**XID Type:**

- ☐ Format 1
- ☒ Format 2

**Remote Node Name:**

- Network Name:
- Control Point Name:
- Remote Node ID:

**Peer DLC Role:**

- ☐ Primary
- ☐ Secondary
- ☐ Negotiable

**Compression Type:** None

Buttons at the bottom: OK, Cancel, Help.



**Figure 61 Migration Mission Definition**

```

---- Control-V CATEGORY MIGOS1C7          MIG MISSION MIGOS1C7 ----- (M S)
COMMAND ==>                               SCROLL==> CRSR
+-----+
===== >>>>>>>>>>>>>>>> TOP OF CATEGORY PARAMETERS <<<<<<<<<<<<<<<< =====
CATEGORY MIGOS1C7          MISSION MIGOS1C7
OWNER      M15             TASKTYPE MSM      GROUP
DESC
=====
                                STAGE 01 SCHEDULING PARAMETERS
DAYS   DCAL
   AND/OR
WDAYS   WCAL
MONTHS  1- Y 2- Y 3- Y 4- Y 5- Y 6- Y 7- Y 8- Y 9- Y 10- Y 11- Y 12- Y
DATES
CONFICAL          SHIFT    RETRO N MAXWAIT 00
MINIMUM           PDS
=====
IN      MIG- DASD- TO- OSS- 11M ODAT
TIME FROM      TO      NOT LATER THAN      PRIORITY
=====
OUT
SHOUT WHEN NOTOK                                TO OPER            URGN R
MSG MIGOS1C7 STAGE 01 ENDED NOT OK
SHOUT WHEN                                TO            URGN
MSG
=====
RETENTION DAYS 02922          FORCE          SECONDARY SKELETON  MIGOS1C7
=====
STAGE 01 PRIMARY  MEDIA NAME OSS      AGE 00030 REFRESH EVERY 00183
PREFIX
SECONDARY MEDIA NAME CART            REFRESH EVERY 01460
=====
                                MIGRATION PATH SCHEDULING PARAMETERS
DAYS   DCAL
   AND/OR
WDAYS    0, 6                               WCAL
MONTHS  1- Y 2- Y 3- Y 4- Y 5- Y 6- Y 7- Y 8- Y 9- Y 10- Y 11- Y 12- Y
DATES
CONFICAL          SHIFT    RETRO N MAXWAIT 00
MINIMUM           PDS
=====
IN      MIG- OSS- TO- CART- 7Y ODAT
TIME FROM      TO      NOT LATER THAN      PRIORITY
=====
OUT
SHOUT WHEN NOTOK                                TO OPER            URGN R
MSG MIGOS1C7 STAGE 02 ENDED NOT OK
=====
STAGE 02 PRIMARY  MEDIA NAME CART      AGE 00365 REFRESH EVERY 01460
SECONDARY MEDIA NAME                    REFRESH EVERY
STAGE 03 PRIMARY  MEDIA NAME            AGE      REFRESH EVERY
SECONDARY MEDIA NAME                    REFRESH EVERY
=====
===== >>>>>>> END OF MIGRATE MISSION PARAMETERS OF THIS CATEGORY <<<<<< =====

PLEASE FILL IN MISSION PARAMETERS.  USE "SHPF" TO SEE PFK DEFINITION      11.04.10

```

## Exception Handling

If the migration job abends in the first step (MIGRAT), the status of the migration mission is changed to ENDED-NOTOK. When this happens, check why the abend occurred and correct the problem. After the problem has been corrected, rerun the migration mission from the Active Missions file.

If the migration job abends during the second step (ANALYZE), the status of the migration mission remains MIGRATION IN PROCESS. When this happens, reset the migration mission status to ENDED through the MIGRESET job in the Control-D JCL library. For more information on the MIGRESET utility, refer to the Control-D and Control-V utilities chapter of the *INCONTROL for z/OS Utilities Guide*.

If a migration mission ends NOTOK because one or more CDAM files did not migrate successfully, the same mission can be rerun by specifying option R in the Active Missions Environment screen, or it can be reordered. In either case, only CDAM files that did not migrate successfully during the previous run are migrated.

Submitting a partially run migration job does not create duplicate copies of files on the target media. The migration job verifies that each file is cataloged, with the appropriate migration prefix.

## Global Index Facility (Control-V Only)

The Global Index facility is a Control-V feature that allows the end-user to select reports for viewing based on the index values found in the Global Index database.

Control-V maintains a separate index for every report in the Control-V repository. By selecting reports by a particular index value, the user selects a set of reports, and Control-V searches all indexes of those reports for the indexes that contain the particular index value.

The Global Index facility maintains the Global Index database. This database contains multilevel index values that point to a list of reports that contain these index values.

Using the Global Index database, you can get a list of multilevel index values and quickly create a Report list using the Hit-list method when you specify index names and values in the selection criteria. Using the Global Index database with the Hit-list method eliminates searching every index file.

For more information on how reports are accessed through the Global Index database, see [Accessing Reports Through the Global Index Database](#) (on page 522).

## Creating and Maintaining the Global Index Database

The Global Index Database is implemented as a set of DB2 tables.

The following steps should be performed to install the Global Index Database:

1. Define which Control-V index paths you would like to load into the Global Index Database.
2. Create DB2 tables for storing these paths, and create DB2 indexes. For details see [Creating DB2 Tables](#) (on page 515).
3. Prepare the CTDGIDB2 special member to describe the relationship between the Control-V index paths and DB2 tables. For details see [Relationship Between CTV Index Paths and DB2 Tables](#) (on page 516).
4. Bind the DB2 application plan for the CTDGID Global Index interface module. For details see [Global Index Interface](#) (on page 519).
5. Prepare jobs for loading information into the DB2 tables. For details see [Loading Information into the Global Index DB2 Tables](#) (on page 519).
6. Prepare jobs for cleaning up the DB2 tables. For details see [Cleaning the Global Index Database](#) (on page 522).

## Creating DB2 Tables

All Global Index values associated with a particular Global Index path are stored in a DB2 table. Fields in the table correspond to the fields of Control-V indexes. An additional field REP\_KEY contains the key of the corresponding Control-D report entry. The REP\_KEY field should be defined with the FOR BIT DATA clause.

Several Control-V Index paths can be stored into the same DB2 table if the table contains fields from all the paths. Such a table can be used in the event that there is a Control-V path that covers all the fields in the table. For example, if there are three Control-V Index paths

- ACCOUNT
- ACCOUNT/DATE
- ACCOUNT/NAME

you can organize two DB2 tables. One table would contain the ACCOUNT and the ACCOUNT/DATE paths, while the other would contain only the ACCOUNT/NAME path.

If there is a large number of entries to be loaded into the DB2 table, several tables can be created to keep entries for the same Control-V Index path. You can create a new DB2 table, depending on your needs, for each year, quarter, month, multiple years and so on. To identify each table you can use a suffix to the table name to identify the period covered by the table. For example, if you created a new table for each year the names would be CTD.GIRD07 to keep data of year 2007, CTD.GIRD08 to keep data of year 2008, and so on. These tables are joined during data retrieval or you can specify a specific table to process. For more information, see [Accessing Reports Through the Global Index Database](#) (on page 522).

Additional DB2 tables containing only high level Indexes of the Index Path can be created to improve the performance of the Index values list request. For example, if the main DB2 table contains the values of the Index path DEPARTMENT/TEAM/ACCOUNT, and there is not an especially large number of DEPARTMENT values and TEAM values, getting a list of Departments or Teams from a large DB2 table can take a disproportionately long time. In this case, it makes sense to create two additional DB2 tables: CTD.DEP with the DEPARTMENT values only and CTD.DEP\_TEAM with two columns - DEPARTMENT and TEAM. The result is, the retrieval of the DEPARTMENT list is done from the CTD.DEP table and retrieval of the TEAM list for each DEPARTMENT from the CTD.DEP\_TEAM table instead of performing these requests from the big main table. The additional tables can be handled manually or can be loaded automatically while loading the main table. This is done using the CTVUPGDB utility or from within a decollation mission. Use of such additional tables is optional, it can be specified in the CTDGIDB2 member (For more information, see [Relationship Between CTV Index Paths and DB2 Tables](#) (on page 516)).

The database administrator at the site is responsible for the design and organization of the DB2 tables. The database administrator should make needed definitions according to the requirements of the application to be implemented and according to the amount of information which is to be stored in the Global Index Database.

A DB2 index should be created for each DB2 table in order to prevent adding duplicate index values into the table, and in order to provide better performance when retrieving index values. The CTDGBCRT member in the CTD JCL library is a sample job for creating the DB2 table. An example of this job is shown in the following figure.

**Figure 62 CTDGBCRT Member Sample Job**

```
//DSNTEP2 EXEC PGM=IKJEFT01, DYNAMNBR=20
//DBRMLIB DD DSN=DSN610. DBRMLIB. DATA, DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN DD *

CREATE TABLE CTD. GIRAD
  (ACCOUNT CHAR(10) NOT NULL,
   DATE_ CHAR(8) NOT NULL,
   REP_KEY CHAR(24) NOT NULL FOR BIT DATA)
IN DBCTD. TSCTD;

CREATE TYPE 2 UNIQUE INDEX CTD. IXGIRAD ON CTD. GIRAD
  (ACCOUNT ASC,
   DATE_ ASC,
   REP_KEY ASC)
  CLUSTER
  CLOSE YES

  USING STOGROUP SGCTD
  PRIQTY 1000000
  SECQTY 100000
  ERASE NO

  FREEPAGE 10
  PCTFREE 20;

GRANT SELECT ON TABLE CTD. GIRAD TO PUBLIC
//SYSTSIN DD *
DSN SYSTEM(DSN1)
RUN PROGRAM(DSNTEP2) PLAN(DSNTEP61) -
  LIB(' DSN610. RUNLIB. LOAD' )
END
//*
```

## Relationship Between CTV Index Paths and DB2 Tables

The CTDGIDB2 member in the CTD PARM library includes a list of all paths that are handled by the Global Index Database, and defines the relationship between Control-V Index paths and DB2 tables. This member contains the path number and the name of DB2 table storing information for this path. Subsequent lines contain Control-V index names and corresponding field names in the DB2 table.

CTDGIDB2 member statements are described in the following table, and an example is provided below:

**Table 171 CTDGIDB2 Member Statements**

| Statement              | Description                                                                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DSN= <i>DSN_NAME</i>   | DB2 Subsystem name                                                                                                                                                |
| PLAN= <i>PLAN_NAME</i> | DB2 application plan name for the CTD DB2 interface module. This application plan should be bound from the DBRL member CTDGID supplied in the IOA SAMPLE library. |

| Statement                                                                                                                                                                                                                                                                                                                                                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The two preceding statements are obligatory and should be coded only once on the top of the member. The PATH, TABLE, and FIELD statements shown below should be coded for each Global Index path. The REKEY statement is optional. The END line, as shown in the code example that follows this table, indicates the conclusion of the entire member statement.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| PATH= <i>NNN</i><br>or<br>PATH= <i>NNN+</i>                                                                                                                                                                                                                                                                                                                            | Number of the path. Each path should have a unique number. The '+' sign should follow the number if this PATH must be loaded while running a decollation mission.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| TABLE= <i>TABLE_NAME</i>                                                                                                                                                                                                                                                                                                                                               | DB2 table name containing index values and report keys of the index path. This statement can be specified more than once if data for this path is kept in more than one table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| FIELD=<br>( <i>NAME1,NAME2,LL</i> )<br>[, <i>TABNAME [+]</i> ]                                                                                                                                                                                                                                                                                                         | <p>This statement should be coded for each index field in the path. In this statement</p> <ul style="list-style-type: none"> <li>NAME1 is the Control-V index name defined in the decollation mission definition</li> <li>NAME2 is the name of the corresponding field in the DB2 table</li> <li>LL is the length of the field. The value for LL should be the same as the Control-V index length in the decollation mission definition.</li> <li>TABNAME is an optional parameter. It is the name of an additional DB2 table that contains values of higher levels, including the current level. This table is used for fast retrieval of the list of the current level Index values. If this parameter is omitted, the list is retrieved from the main DB2 table indicated in the TABLE statement. If the "+" follows this name, the TABNAME table is loaded by the CTVUPGDB utility, or automatically from the decollation mission, while loading the main DB2 table. Otherwise, the table must be handled manually.</li> </ul> |
| REPKEY=<br><i>REPORT_KEY_NAME</i>                                                                                                                                                                                                                                                                                                                                      | Name of the report key field in the DB2 table. Optional. Default REP_KEY.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| END                                                                                                                                                                                                                                                                                                                                                                    | Last statement in the member.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Figure 63 CTDGIDB2 Member Statement Example**

|                                               |                      |
|-----------------------------------------------|----------------------|
| DSN=DSN1                                      | DB2 SUBSYSTEM NAME   |
| PLAN=CTDGI PL6                                | DB2 APPLICATION NAME |
| PATH=001                                      | PATH NUMBER          |
| TABLE=CTD. G1RAD                              | DB2 TABLE NAME       |
| FIELD=(ACCOUNT, ACCOUNT, 10)                  | INDEX LEVEL 1 FIELD  |
| REPKEY=REP_KEY                                | REPORT KEY           |
| PATH=002                                      | PATH NUMBER          |
| TABLE=CTD. G1RAD                              | DB2 TABLE NAME       |
| FIELD=(ACCOUNT, ACCOUNT, 10)                  | INDEX LEVEL 1 FIELD  |
| FIELD=(DATE, DATE_, 8)                        | INDEX LEVEL 2 FIELD  |
| REPKEY=REP_KEY                                | REPORT KEY           |
| PATH=003                                      | PATH NUMBER          |
| TABLE=CTD. G1RAN                              | DB2 TABLE NAME       |
| FIELD=(ACCOUNT, ACCOUNT, 10)                  | INDEX LEVEL 1 FIELD  |
| FIELD=(NAME, NAME, 15)                        | INDEX LEVEL 2 FIELD  |
| REPKEY=REP_KEY                                | REPORT KEY           |
| PATH=004+                                     | PATH NUMBER          |
| TABLE=CTD. G1RDN08                            | DB2 TABLE 1 NAME     |
| TABLE=CTD. G1RDN07                            | DB2 TABLE 2 NAME     |
| TABLE=CTD. G1RDN06                            | DB2 TABLE 3 NAME     |
| FIELD=(KUNDNr, KUNDNr, 9)                     | INDEX LEVEL 1 FIELD  |
| REPKEY=REP_KEY                                | REPORT KEY           |
| PATH=005                                      | PATH NUMBER          |
| TABLE=CTD. DEP_TEAM_ACCNT                     | DB2 TABLE NAME       |
| FIELD=(DEPARTMENT, DEPARTMENT, 3) , CTD. DEP+ | INDEX LEVEL 1 FIELD  |
| FIELD=(TEAM, TEAM, 2) , CTD. DEP_TEAM+        | INDEX LEVEL 2 FIELD  |
| FIELD=(ACCNT, ACCOUNT, 9)                     | INDEX LEVEL 3 FIELD  |
| REPKEY=REP_KEY                                | REPORT KEY           |
| PATH=006                                      | PATH NUMBER          |
| FIELD=(DEPARTMENT, DEPARTMENT, 3) , CTD. DEP  | INDEX LEVEL 1 FIELD  |
| FIELD=(TEAM, TEAM, 2) , CTD. DEP_TEAM+        | INDEX LEVEL 2 FIELD  |
| REPKEY=REP_KEY                                | REPORT KEY           |
| PATH=007                                      | PATH NUMBER          |
| TABLE=CTD. G1RJAR                             | DB2 TABLE NAME       |
| FIELD=(JOBNAME, JOBNAME, 45)                  | INDEX LEVEL 1 FIELD  |
| REPKEY=REP_KEY                                | REPORT KEY           |
| END                                           |                      |

## Global Index Interface

Control-V uses the Global Index interface (CTDGID) module to retrieve information from DB2. The DB2 application plan for this module should be created from the CTDGID DBRM module included in the IOA SAMPLE library. The DB2 application plan should be authorized for users running the IOA application server and executing the CTVGICL utility.

The CTDGGBPL member in the CTD JCL library is a sample job for binding DBRM to a DB2 application plan and authorizing this plan to all users. An example of this job is shown in the following code:

**Figure 64 CTDGGBPL Member Sample Job**

```

/* BIND PLAN
//DSNBIND EXEC PGM=IKJEFT01, DYNAMNBR=20
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSTSIN DD *
  DSN SYSTEM(DSN1)
  BIND PLAN(CTDGIPL6) MEM(CTDGID) ACT(REP) ISOLATION(CS) -
    LIB(' %ILPREFA%. SAMPLE' )
  END
/* AUTHORIZATION TO ALL USERS
//DSNGRAN EXEC PGM=IKJEFT01, DYNAMNBR=20
//DBRMLIB DD DSN=IOAP.V900.SAMPLE, DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN DD *
  GRANT EXECUTE ON PLAN CTDGIPL6 TO PUBLIC
//SYSTSIN DD *
  DSN SYSTEM(DSN1)
  RUN PROGRAM(DSNTEP2) PLAN(DSNTEP61) -
    LIB(' DSN610.RUNLIB.LOAD' )
  END
//

```

## Loading Information into the Global Index DB2 Tables

There are two methods for loading information into the global index DB2 tables:

- The first method is to load the DB2 tables immediately when running a decollation mission. To activate this method
  - a. Set the subparameter G, in the DO INDEX statement of the mission definition, to 'Y'.
  - b. Mark the corresponding PATH in the CTDGIDB2 member by specifying a '+' sign after the last digit of the path number.

The Index values will be loaded to the DB2 table specified for this PATH in the CTDGIDB2 member. If several DB2 tables are specified, the values are loaded to the first table in the list.

This method is recommended to use for reports that do not contain a large number of Index values. Using this method for reports with a large number of Index values, considerably reduces the decollation mission's performance.

- The second method is to run a special job to load the index values from the previously decollated or migrated reports to DB2 GI. A sample of this job is supplied in the CTDGBILD member in the CTD JCL library. The job contains three steps:

1. Run the CTVUPGDB utility with the LIST input parameter set to DB2. For a description of the utility parameters see the CTVUPGDB utility in the *INCONTROL for z/OS Utilities Guide*.

The CTVUPGDB utility unloads index values with report keys from the Control-V repository to the flat file pointed to by the DACTVLST DD statement. Only indexes existing in the CTDGIDB2 member of the reports matching the selection parameters are unloaded to the file.

The file includes the following record types:

- P records – P records contain "P" in the second position, followed by the path name. Each index level is 20 bytes.  
Each P record is followed by V records that contain index values with report keys for the specified index path.
- V records – V records contain "V" in the second position. V records are laid out as shown in the following table:

**Table 172 V Record Layout**

| Position | Value                                                                                                                                       | Length |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 2        | V                                                                                                                                           | 1      |
| 3        | Index path value, which contains all index level values, with lengths specified in the decollation mission definition (without separators). | 222    |
| 240      | Path number from the CTDGIDB2 member                                                                                                        | 3      |
| 243      | Report key                                                                                                                                  | 24     |

2. Load the DB2 tables using the DB2 LOAD utility from the file created in step 1. Only V records are used.

Several DB2 tables can be loaded by a single run of the utility. Each INTO TABLE statement, followed by its field description statements, must be specified for each DB2 table to be loaded.

The INTO TABLE statement has the following syntax:

```
INTO TABLE TABLE_NAME WHEN (240: 242) =NNN
```

where NNN is the path number specified in the CTDGIDB2 member for the path that covers all fields of the loaded DB2 table.



3. Delete the file indicated by the DACTVLST DD statement. This can only be done if the previous step ended successfully. If the previous step fails, the DACTVLST file is not deleted. The entries from this file are loaded to DB2 tables by the next run of the job.

An example providing for the loading of several DB2 tables in a single job is shown in the following sample job:

**Figure 65 CTDGBILD Member Sample Job**

```
//CTVUPGDB EXEC CTVUPGDB
//DACTVLST DD DSN=CTVP. V900. INDLST01, DISP=(MOD, CATLG, DELETE),
// SPACE=(CYL, (10, 10), RLSE)
//SYSIN DD *
LOAD
USER=(PROD, MGT)
JOBNAME=JJJ*
PATH=ACCOUNT/DATE
PATH=ACCOUNT/NAME
PATH=WAREHOUSE/ITEM_NUM
LIST=DB2
/*
//DB2LOAD EXEC DSNUPROC, COND=(4, LE)
LOAD DATA
RESUME YES
INTO TABLE CTD. GIRAD WHEN (240:242) = '002'
( ACCOUNT POSITION (3) CHAR(10),
DATE_ POSITION (13) CHAR(8),
REP_KEY POSITION(243) CHAR(24))
INTO TABLE CTD. GIRAN WHEN (240:242) = '003'
( ACCOUNT POSITION (3) CHAR(10),
NAME POSITION (13) CHAR(15),
REP_KEY POSITION(243) CHAR(24))
INTO TABLE CTD. GIRWI WHEN (240:242) = '004'
( WAREHOUSE POSITION (3) CHAR(4),
ITEM_NUM POSITION (7) CHAR (10)
REP_KEY POSITION(243) CHAR(24))
//SYSREC DD DSN=CTVP. V900. INDLST01, DISP=OLD
//SORTOUT DD UNIT=SYSDA, SPACE=(CYL, (100, 10))
//SYSUT1 DD UNIT=SYSDA, SPACE=(CYL, (100, 10))
/*
//DELETE EXEC PGM=IEFBR14, COND=(4, LT)
//SYSTSIN DD DISP=(OLD, DELETE),
// DSN=CTVP. V900. INDLST01
//
```

## Cleaning the Global Index Database

You can use the CTVGICL Control-V utility to remove report entries that no longer exist in Active or Migrated User Report files from the DB2 tables. For a description of the CTVGICL utility, see the *INCONTROL for z/OS Utilities Guide*.

## Accessing Reports Through the Global Index Database

Navigation within the Index name and Index value hierarchy through the Global Index database is available in Control-D/WebAccess and in the Control-D/V - User Reports Entry Panel in the IOA facility.

Control-D and Control-V archived reports can be selected through the Global Index database using the Hit-list method when Index names and Index values are specified as part of the selection criteria. Multilevel Index name and value can be specified in the WebAccess filter. Main Index name and value can be specified in the Control-D/V User Reports Entry Panel of the Online facility (option U on the IOA Primary Option menu).

When a multilevel Index name and value is specified in the WebAccess filter the reports are always selected through the Global Index database.

When a single level Index name and Index value is specified in the WebAccess filter or the User Reports Entry Panel, the Global Index database is used depending on settings in the optional wish WV0365. If it is set to APPLY=YES and the Index path is included in the member CTDGIDB2, the Global Index database is searched instead of every index file of each report.

If the accessed Index Path values reside in several DB2 tables, the tables are joined for searching by default. You can specify a table name suffix and use only one table from the list to improve performance. The table name suffix can be specified in the filter field CATEGORY by the sentence TBL= <table name suffix>. For example, path 004 (PATH=004) includes the following DB2 tables (see [Global Index Interface](#) (on page 519)):

- CTD.GIRDN08 - contains the data for year 2008
- CTD.GIRDN07 - contains the data for year 2007
- CTD.GIRDN06 - contains the data for year 2006

If the user specifies TBL=08 in the filter field CATEGORY, only table CTD.GIRDN08 will be searched.

## Job Archiving

Organizations that run a large number of production jobs daily need to archive job sysout while maintaining the ability to access specific jobs, specific job steps, or jobs with certain attributes.

This can be accomplished using the Job Archiving facility, as described in the following steps:

1. Run the production jobs with a dedicated MSGCLASS.

The job name ARCHIVE is reserved for the Job Archiving facility and should not be used for a production job.

2. Order a generic decollation mission for the dedicated MSGCLASS output class. The generic decollation creates a cumulative CDAM file containing the output of all the jobs that satisfy the decollation mission's criteria. Each job has a single report entry for same day viewing and tracking.

Enter the following parameters in the generic mission:

- Enter a unique prefix for the CDAM file that is accumulated during the decollation.
- Enter %\$SYSIN=Y in the SET field if SYSINs (in-stream data) are to be decollated.
- Enter ALLOCPT=JOBSDSN1 in the PRINT/CDAM PARMS field.
- Enter %%JOBNAME(1,8) for the DO NAME statement (DO NAME=%%JOBNAME(1,8)) to use the job name of the job currently being decollated as the report name.
- Enter JOBNAME\_DDNAMES for the DO INDEX statement (DO INDEX=JOBNAME\_DDNAMES) to create a main index with the name JOBNAME with a subindex of the DDNAMES. The main index has a single value comprised of fixed-length fields, listed in the table below, separated by a blank. (The same format is also used by the CTVJAR utility. This Index structure ensures unified access to the reports, before and after consolidation. For more information on the CTVJAR utility, see the *INCONTROL for z/OS Utilities Guide*.)
- Enter JOBARC for the DO MIGRATE statement (DO MIGRATE=JOBARC) to ensure that the reports are consolidated before deletion. JOBARC is the name of a fictitious migration mission that is deleted after the report is consolidated.
- Enter \*+CC for the DO REMARK statement (DO REMARK=\*+CC) to capture both the highest condition code of the job and the SMF ID of the system in which it ran (to be used for index value creation). The Parameters LINE and COL of the DO REMARK statement must be tailored to capture the SMF ID from the JES message log of the job. In the following example, the values specified for LINE and COL capture the SMF ID in the JES2 message \$HASP373.

The sample report decollation mission in Concept illustrates these specifications. This sample mission is also contained in member JOBARC of the Control-D REPORTS library.

**Table 173**            **JOBNAME Index value fields**

| Field Name | Description                               | Length |
|------------|-------------------------------------------|--------|
| JOBNAME    | Name of the job                           | 8      |
| JOBID      | ID of the job in the format JNNNNNNN      | 8      |
| SMFID      | SMF ID of the system in which the job ran | 4      |
| COMP-CODE  | Completion code of the job                | 5      |
| DATE       | Date of the job in the format DDMMYY      | 6      |
| START-TIME | Start time of the job in the format HHMM  | 4      |
| END-TIME   | End time of the job in the format HHMM    | 4      |

Example:

**Figure 66 Job Archiving Decollation Mission Example**

| CATEGORY                             | GENCAT  | JOBNAME *         |                 |     | GENERIC Y | MONITOR   |            |
|--------------------------------------|---------|-------------------|-----------------|-----|-----------|-----------|------------|
| =====                                |         |                   |                 |     |           |           |            |
| DEF                                  | COPIES  | LVL               | USER            |     | DEST      |           | MAX COPIES |
| =====                                |         |                   |                 |     |           |           |            |
| ON                                   | CLASS   | = R               | EXTWTR          |     | DEST      |           | FORM       |
| PRT                                  | COPIES  | LVL               | USER            |     | DEST      |           | MAX COPIES |
| PRINT/CDAM PARMS = ALLOCOPT=JOBSDSN1 |         |                   |                 |     |           |           |            |
| PRINT/CDAM PARMS =                   |         |                   |                 |     |           |           |            |
| WHEN                                 | LINE    | -                 | COL             | -   | PRINT     | REF NXT   | CT ND/OR   |
| STRING =                             |         |                   |                 |     |           |           |            |
| DO                                   | NAME    | = %%JOBNAME(1, 8) |                 |     |           |           |            |
| DO                                   | USER    | = MKT             |                 | LVL | LINE      | COL -     | S A T      |
| SYNONYM =                            |         |                   |                 |     |           | CONCAT =  |            |
| DO                                   | INDEX   | =                 | JOBNAME_DDNames |     |           |           | R G        |
| DO                                   | REMARK  | =                 | *+CC            |     | LINE 004  | COL 073 - | 077        |
| DO                                   | REMARK2 | =                 |                 |     | LINE      | COL       |            |
| DO                                   | REMARK3 | =                 |                 |     | LINE      | COL       |            |
| DO                                   | MIGRATE | =                 | JOBARC          |     |           |           |            |
| DO                                   |         |                   |                 |     |           |           |            |
| WHEN                                 | LINE    | -                 | COL             | -   | PRINT     | REF NXT   | CT ND/OR   |

- Once each day, run the CTVJAR utility to consolidate all report entries created by the generic decollation into one report entry, with an index that has an entry for each job. The CTVJAR utility processes all accumulated CDAM files that have a specific prefix (the unique prefix specified in the generic decollation mission) and that were created until the end of the previous day. The CTVJAR utility creates a single report entry with the specified attributes (for example, printing, backup, or migration mission) and a single main index. Subindex DDNames that was created during decollation is copied and converted to a subindex of the newly created index.
- Delete the job-specific report entries with the CTDDLRP utility. In the CTDDLRP control statements, set the number of days that each report entry must be kept. Report entries can either be kept for one day (until the consolidation routine is run) or can be kept for several days to expedite retrieval.
- Display type J is available in the User Reports entry panel for accessing jobs archived by the Job Archiving facility both before and after consolidation. This display type can be selected by issuing a DI J command in the entry panel's command line. Display type J can be used to initiate a hit-list search for a specific job having specific attributes (job name, job number, run date, run time, run system, and the job's highest return code). The search criteria entered by the user is used by Control-V to dynamically compose the appropriate index value and display the job the user is looking for. For details on the User Reports entry panel, see the online facilities chapter in the *Control-D and Control-V User Guide*.

6. To improve performance of the Hit-list search, do one of the following:
  - Load the main index (JOBNAME), which contains all search attributes, to the Global Index database. The total Index length is 45 bytes. For more information, see [Global Index Facility \(Control-V Only\)](#) (on page 514).
  - Customize the following components:
  - Job Archiving Decollation mission
7. Specify DO USER = %%JOBNAME in the Job Archiving Decollation mission to create reports with the same User name as the jobname.
  - CTVJAR utility
8. Use parameter USER = %%USER for the CTVJAR utility to create a new consolidated report for each User name (jobname) appearing in the original reports picked up for consolidation.
  - CTDX004 exit
9. Implement the CTDX004 exit, provided in sample CTDX004J. In this case, the specified jobname used as a selection criterion is automatically copied to the USER field in the DI J selection panel.

This approach can improve the performance of the report list request from the DI J selection panel under the following conditions:

- SYSOUTs belonging to different JOBNAME groups are directed to different ALLOCOPT CDAMs
- the JOBNAME is specified in the filter

## IOA Archive Server

The IOA Archive server enables online viewing and immediate printing of reports and indexes that have migrated to non-disk storage media. The server provides access to the media types described in the following table:

**Table 174 Media Types Accessible Through IOA Archive Server**

| Type | Description                                                                                                     |
|------|-----------------------------------------------------------------------------------------------------------------|
| CART | 3490/3490E/3590 Tape Cartridge.                                                                                 |
| DASD | Disks (for example, 3380, 3390, fat-DASD 3390-9 or IBM 3995 Optical Library Dataserver in 3390 emulation mode). |
| OSS  | DataWare/ROSS/OSS or compatible.                                                                                |
| FTK  | FileTek Storage Machine (SM).                                                                                   |
| OAM  | IBM Object Access Method (OAM).                                                                                 |

There is no connection or dependency between the Control-D and Control-V monitor and the IOA Archive server. Each can be brought up and down independently.

## Device Definition and Usage

### Cartridge (CART) Media

The cartridge devices defined in the IOASPRM member in the PARM library for media type CART can be used in the following modes: dedicated and dynamic.

#### Dedicated Device Mode

Dedicated devices are allocated to the server during the entire time the device is connected to the server. Devices can be defined explicitly by parameter DEVADDR, or implicitly by parameter DEVQTY. Devices can be connected (STARTed) or disconnected (STOPped) at any time using operator commands.

When using this mode, the number of devices available for the server is known. The response time for user requests can be predicted based on the server's workload.

#### Dynamic Device Mode

Dynamic devices are allocated to the server when needed, and freed when no requests are pending. Dynamic devices are defined implicitly using the DEVQTY parameter. This parameter defines the maximum number of devices that are allocated when the server is started. The allocation is done upon request. No device is allocated until an online viewing user issues the first access. The DEVQTY parameter is mandatory when using the dynamic device mode. The DYNDEVRL parameter defines when the device is freed after requests are processed. as follows:

**DYNDEVRL=(*method, i d l e t i m e*)**

**Table 175 Fields for Parameter DYNDEVRL**

| Field    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| method   | Indicates the allocation method to use when processing a request for a volume. Valid values:                                                                                                                                                                                                                                                                                                                                                   |
| SWITCH   | Free the device when a request for another volume is to be processed. The device can be released and allocated to another job even if there are still requests pending.<br><br>Dynamic allocation is performed in a standard manner using the MVS catalog. This is the recommended method at sites with multiple Robotic Tape Libraries and at sites where IOASMON non-switched allocation impacts the Tape Management System's functionality. |
| NOSWITCH | Process requests for all volumes before releasing the device. Default.                                                                                                                                                                                                                                                                                                                                                                         |

| Field    | Description                                                                                                                                                                                                                                                                                   |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| idletime | Number of minutes to hold the device after the last request is processed. This parameter ensures that if a request is issued within the specified time interval, the device is still available to the server. This parameter applies to both SWITCH and NOSWITCH methods. Default 1 (minute). |

## Updating the OSS Database

Before updating the OSS database by adding or deleting virtual tapes, or by importing or exporting platters, stop the IOA Archive server or the appropriate media in the IOA Archive server.

When the update is complete, run job LODOSSDB from the IOA PARM library to create the OSS Extract Dataset file. After this job completes, reactivate the IOA Archive server or, if only the media was stopped, restart the media.

## FileTek Storage Machine Media Definition

Control-V communicates with the FileTek Storage machine through an application interface.

The Resources (devices) defined in IOASPRM for media type FTK are logical devices. A logical device task is activated whenever a request is made to access a dataset that is not already being handled by another logical device. Each device task handles only one dataset at a time.

### FTK Media Definition

The following table describes the parameters that are used to define FTK media during Control-V installation:

**Table 176 FTK Media Definition Parameters for Control-V Installation**

| Parameter | Description                                                                                                                                                                                                                                                                   |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAXCONN   | Maximum number of logical devices that can be active at any one time for the media. Each logical device opens a session with the Storage Machine (SM). To determine an appropriate value for this parameter, see the documentation supplied with the FileTek Storage machine. |
|           | Note: If more than one media has been defined for the same SM, you must verify that the sum of the values specified for parameter MAXCONN in all media definitions for the SM does not exceed the maximum number of sessions that the SM can support.                         |

| Parameter | Description                                                                                                                                                             |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SMNAME    | Name of the FileTek Media being defined.                                                                                                                                |
| SUBSYS    | Name of the FileTek Host Storage Machine subsystem.                                                                                                                     |
| ACCOUNT   | Storage Machine Account ID. Control-V uses this value to open a session with the FileTek SM.                                                                            |
| PASSWORD  | Password for the specified ACCOUNT.                                                                                                                                     |
| GROUP     | An Access Group name for files migrated to this media.                                                                                                                  |
| GROUPPWD  | Used to specify passwords for access to files in the specified GROUP. Separate passwords can be specified for READ, WRITE, and DELETE access of the files in the GROUP. |

Using the above parameters you can create several different definitions for FTK media. Some possible reasons for creating more than one definition for FTK media include the following:

- You have more than one FileTek Storage Machine at your site.
- You want to maintain several different groups of datasets on the same SM (for example, with different passwords). To accomplish this, define the different FTK media with the same subsystem (SUBSYS) and storage-machine (SMNAME) name, but with different group names (GROUP) and group passwords (GROUPPWD).

For a detailed description of the parameters used for FTK media definition, see the Control-V chapter of the *INCONTROL for z/OS Installation Guide Installing*.

## Object Access Method (OAM) Usage

The Control-V IOASMON Archive server retrieves reports from the OAM through the OSREQ application interface.

The resources (devices) defined in IOASPRM for media type OAM are logical devices. A logical device task is activated whenever a request is made to access a dataset that is not already being handled by another logical device. Each logical device handles only one dataset at a time.

Up to 100 logical devices can be activated at a time depending either on the value specified for Control-V installation parameter MAXCONN or, optionally, the maximum number set through a START or STOP operator command. If the maximum number of logical devices are active concurrently and additional requests are made, those requests wait in a queue for an available logical device.

## Centera Usage

The Control-V IOASMON Archive server retrieves reports from the EMC Centera storage system through the Centera SDK.

When a Centera media is activated, the first TCP/IP connection is opened to the Centera node. The TCP/IP connection is used communicating between Centera and IOASMON. These connections remain open, but idle, except when they are being used to process Centera requests and responses.



Each time a Control-D component sends a request to IOASMON, IOASMON determines whether there are any available (currently idle) TCP/IP connections.

- If there is an available open connection, it is used for the current request.
- If there are no available open connections, a new connection is opened.

The number of connections to Centera is limited by the MAXCONN parameter in the corresponding media section of IOASPRM.

- If the maximum number of open connections are active concurrently and additional requests are made, those requests wait in a queue for an available open connection.

## Media and Resource Control

The use of each media and resource defined to the IOA Archive server can be controlled using operator commands.

- Each media with all its resources can be stopped and restarted.
- Resources (devices, sessions, and so on) can be connected to or disconnected from the IOA Archive server.

The following topics describe the operator commands for media and resource control.

### Media Control

Each media defined to the IOA Archive server can be stopped and restarted separately. To stop a media with all its resources, issue operator command

---

**F IOASMON, STOP MEDIA=*media-name***

---

When the media is stopped, an appropriate message is displayed on the operator console.

To start a media, issue operator command

---

**F IOASMON, START MEDIA=*media-name***

---

When the media is ready to receive requests, an appropriate message is displayed on the operator console.

### Resource Control

Resources and their usage differ by media type.

### ROSS/OSS Media – DataWare/ROSS/OSS Storage Subsystem

The ROSS/OSS works in 3490 emulation. Its resources are treated like "3490" devices. The devices are referred to by device number. Each device defined to the IOA Archive Server can be stopped and restarted separately.

- To stop an OSS device, issue operator command  
 F IOASMON, STOP MEDIA=*media-name*, DEVICE=*device-number*

When a device stops, an appropriate message is displayed on the operator console.

- To start an OSS device, issue operator command

```
F IOASMON,START MEDIA=media-name,DEVICE=device-number
```

When a device is ready to process requests, an appropriate message is displayed on the operator console.

Before starting an OSS device, make sure that the device is online and ready in the system.

## CART Media – 3490/3490E/3590 Tape Cartridge Subsystem

The resources are actual tape or cartridge devices. Devices are referred to by device number, or by specifying the quantity of devices and letting the IOA Archive server determine which to use or free. Each device defined to the IOA Archive server can be stopped and restarted separately.

- To start a specific device, issue operator command

```
F IOASMON,START MEDIA=media-name,DEVICE=device-number
```

Before starting a CART device, make sure that the device is online and ready in the system.

This command can be issued only when the devices are dedicated to the IOA Archive Server. If the devices are used dynamically, start a device by specifying device quantity, using the DEVQTY parameter.

- To start one, some, or all devices of a specific media, issue operator command

```
F IOASMON,START MEDIA=media-name,DEVQTY=number | ALL
```

where *number* can be any integer from 1 through 99, or the value ALL can be specified instead.

A DEVQTY parameter of (5,1), for example, indicates that a maximum of five devices can be used by the IOASMON, and that only one device can be used by the IOASMON for this media when the media is initialized. If more than one drive will always be needed, the value of the DEVQTY parameter should be specified as (5,2), (5,3), or more. This can be dynamically changed by issuing the following operator command:

```
F IOASMON,START MEDIA=media-name,DEVQTY=number | ALL
```

where the DEVQTY parameter means the number of units to increase.

If you dynamically changed the DEVQTY parameter it will revert to the default with the next recycle of IOASMON or system IPL.

As each device becomes ready to process requests, an appropriate message is displayed on the operator console.

Before starting the devices, make sure enough devices are online and ready in the system.

- To stop a specific device, issue operator command

```
F IOASMON,STOP MEDIA=media-name,DEVICE=device-number
```

When the device stops, an appropriate message is displayed on the operator console.

- To stop one, some, or all devices of a specific media, issue operator command

```
F IOASMON,STOP MEDIA=media-name,DEVQTY=number | ALL
```

where *number* can be any integer from 1 through 99, or the value ALL can be specified instead.

As each device is stopped, an appropriate message is displayed on the operator console.

## FTK – FileTek Storage Machine (SM) or OAM – Object Access Method Media

The resources (devices) defined in IOASPRM for media type FTK and OAM are logical devices. A logical device task is activated whenever a request is made to access a dataset that is not already being handled by another logical device. Each logical device handles only one dataset at a time.

Up to 100 logical devices can be activated at one time depending on the value specified for Control-V installation parameter MAXCONN, and optionally, the maximum set through a START or STOP operator command. If more than MAXCONN requests were made concurrently, they wait in a queue for an available logical device.

### Logical Device Status

Logical devices are each assigned one of the statuses described in the following table:

**Table 177 Logical Device Status**

| Status      | Description                                                                 |
|-------------|-----------------------------------------------------------------------------|
| ACTIVE/BUSY | The device is processing a request for file access.                         |
| IDLE        | The device processed a request recently and is waiting for another request. |
| INACTIVE    | The device is not processing any requests.                                  |

When a logical device finishes processing a request, it checks the DSN queue for the next request. If no request is found, the logical device enters the IDLE status. If no request is detected within a limited time period, the device is assigned a status of INACTIVE.

If no requests are being processed and the number of usable devices is one or more, device number one retains a status of IDLE (that is, its status is not set to INACTIVE).

### Reducing and Increasing the Number of Usable Devices

As mentioned above, the maximum number of devices is defined through installation parameter MAXCONN. You can, however, limit the number of devices to be used (usable devices) through operator commands.

- To reduce the number of usable devices, issue operator command

```
F IOASMON,STOP MEDIA=media-name,DEVQTY=num|ALL
```

where *num* is the number of logical devices to be brought down. *num* can be any integer from 1 through 99, or the value ALL can be specified instead.

The STOP command determines which devices must be stopped, according to device status.

- The specified number of INACTIVE devices are stopped.
- If the number of devices to be stopped is greater than the number of devices that are presently INACTIVE, IDLE devices are stopped as well.

- If the number of devices to be stopped is greater than the number of devices that are either INACTIVE or IDLE, BUSY/ACTIVE devices are stopped as well.

Each BUSY device to be stopped completes the request it is processing before being assigned a status of INACTIVE.

- To increase the maximum number of devices, use operator command

```
F IOASMON,START MEDIA=media-name,DEVQTY=num|ALL
```

where *num* is the number of logical devices to be brought up. *num* can be any integer from 1 through 100, or the value ALL can be specified instead.

The maximum set by the START command cannot be greater than the number specified for Control-V installation parameter MAXCONN.

## Starting and Stopping a Specific Logical Device

- To stop a specific ACTIVE (or IDLE) device, issue operator command

```
F IOASMON,STOP MEDIA=media-name,DEVICE=device-number
```

When the device is stopped, the maximum number of usable devices is reduced by 1 and an appropriate message is displayed on the operator console.

- To start a specific INACTIVE device, issue operator command

```
F IOASMON,START MEDIA=media-name,DEVICE=device-number
```

When the device is started, the maximum number of usable devices is increased by 1 and an appropriate message is displayed on the operator console.

The maximum set by the START command cannot be greater than the number specified for Control-V installation parameter MAXCONN.

Since the devices defined for the FTK type media are logical devices (that is, not physical devices), starting or stopping any specific device has the same effect as using the DEVQTY parameter to increase or decrease the maximum number of usable devices by one.

## Displaying Media Information

Information about a media can be displayed by issuing operator command

```
F IOASMON,DISPLAY MEDIA=media-name
```

The information displayed as a result of this command includes media and resource information. The media information includes details such as

- media type
- system unit name or type to be used for this media
- number of pending requests
- type and number of resources

Resource information varies by media type but includes details such as

- device number
- Device use type (DEDICATED/DYNAMIC)
- device status (ACTIVE/BUSY/INACTIVE/IDLE)
- details about the current process, if there is one (for example, user ID, volser, or dsn)
- high or low "water mark"; number of gets and puts; and time of last get and put
- data integrity status flag

## FTK – FileTek Storage Machine (SM) or OAM – Object Access Method Media

Resource information for FTK or OAM media includes

- maximum number of usable devices
- number of devices that are active (with a status of BUSY, ACTIVE, or IDLE)
- status (displayed for each logical device)
- user-ID and the name of the dataset being processed (displayed for each logical device)

Devices that are no longer usable, or are currently INACTIVE, are displayed on the console with a status of INACTIVE.

## Problem Determination

The IOA Archive Server is supplied with internal debugging facilities. Normally, these facilities are dormant. However, if required (for example, your BMC technical representative requests debugging information), you can activate the debugging facility as follows:

1. You can set the debugging level either when starting the IOA Archive server or during normal operation.
  - To start the debugging facility while starting the IOA Archive server, issue operator command  
S IOASMON,DEBUG=level
  - To start the debugging facility during operation, issue operator command  
F IOASMON,SET DEBUG=level

The debugging level can be any value from 0 (no debugging) to 255. The required debugging level, and instructions to set it with a START or MODIFY command, are supplied by your BMC technical representative.

When the IOA Archive server debugging facility is successfully activated, the following message is displayed on the operator console:

|                                               |
|-----------------------------------------------|
| IOA128I IOASMON – DEBUG LEVEL IS SET TO level |
|-----------------------------------------------|

You should not activate the IOA Archive server with parameter DEBUG on a regular basis for the following reasons:

- Spool utilization is greatly increased if a large amount of debugging information is generated.
- In case of a JES problem, the IOA Archive server may become suspended while waiting for JES.

2. Debugging information is printed to DD statements PRTDBG and DADUMP of the IOA Archive server procedure.
3. When problem determination procedures are completed, turn off the debugging facility by issuing operator command:

---

**F IOASMON, SET DEBUG=0**

---

When the IOA Archive Server debugging facility is successfully deactivated, the following message is displayed on the operator console:

IOA128I IOASOM – DEBUG LEVEL IS SET TO 0

## User Report List File Management

The following User Report List files are contained in the Control-D repository:

- Active User Report List file
- History User Report List file
- Migrated User Report List file (Control-V only)
- Permanent User Report List file

These files are managed by the IOA Access Method. Each file consists of two separate sequential datasets:

- the Data component, where the actual record information resides
- the Index component, which provides keyed access to records in the Data component

Both Data and Index components can extend beyond one physical dataset (depending on whether automatic extension was specified for the file during allocation). Initially, a component is allocated as a single physical dataset called the primary extent.

For more information, see [IOA Administration](#) (on page 35).

The file naming convention is

*prefix.dbname.Ennn*

**Table 178 File Naming Convention**

| Field         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>prefix</i> | Set to Control-D installation parameter DBPREFD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>dbname</i> | Set to file identifier name, as follows: <ul style="list-style-type: none"> <li>▪ HST—Control-D History User Report list Data component.</li> <li>▪ ACT—Control-D Active User Report list Data component.</li> <li>▪ ACTI—Control-D Active User Report list Index component.</li> <li>▪ HSTI—Control-D History User Report list Index component.</li> <li>▪ PRM—Control-D Permanent User Report list Data component.</li> <li>▪ MIG—Control-V Migrated User Report list Data component.</li> <li>▪ MIGI—Control-V Migrated User Report list Index component.</li> <li>▪ PRMI—Control-D Permanent User Report list Index component.</li> </ul> |
| <i>Ennn</i>   | Extent sequence number suffix. The suffix consists of the letter E followed by <i>nnn</i> , a number from 000 to 255, indicating the extent sequence number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

#### Example

If Control-D installation parameter DBPREFD contains the value CTD, the following file names are assigned for the Active User Report List file:

- CTD.ACT.E000 for the Data component.
- CTD.ACTI.E000 for the Index component.

Each component uses its own file definition member that resides in the IOA PARM library. The member includes the file's physical and logical attributes. The member name is DEF*xxx* for a Data component, or DEF*xxxI* for an Index component, where *xxx* is the *dbname* as described in the above table. The member is used by the IOADBF utility. Additional utilities are provided to maintain these IOA Access Method files. For more information about these utilities, see the *INCONTROL for z/OS Utilities Guide*.

The files can be activated with dual (mirror image) file support. The dual file name is similar to the main file name, except for the suffix (*Dnnn* instead of *Ennn*). Dual file support can be defined for both the Data component and Index component. It is recommended that this feature be activated only for the Data component to reduce overhead, since the Index component can be built from the Data component.

For details about maintaining these files, see [Repository Maintenance](#) (on page 546).

## Permanent User Report List File

The Permanent User Report List file can be referred to as a report catalog. It contains, for each user, the list of reports the user (recipient) can receive at any time, their copy count (for the user), the print destination (if it is not one of the main computer printers such as LOCAL), and other information.

The Permanent User Report list file is used by end users (recipients) to permanently define the number of (printed) copies they want to receive from each report (in a given category), to request that the report be printed on a local printer, to assign a copy of the report to another user, and to permanently define other report list defaults.

Once a day, the report list in the Permanent User Report List file can be copied to the Active User Report List file. The user, for example, can change the copy count of the reports on the Active User Report List file, but that change remains in effect only for that day. On the next day, the reports of each user are copied again from the Permanent User Report List file to the Active User Report List file with the original (permanent) copy count. Using this simple method, the user can either set the copy count of a report permanently by modifying it in the Permanent User Report List file (using the Online Permanent User Report list screen), or temporarily modify it for a specific day in the Active User Report List file (using the Online Active User Report List screen). All other updatable fields (parameters) work the same way.

There are two ways to access the data stored in this file

- using utility CTDCP2A
- using the decollation mission definition SEARCH parameter

## Utility CTDCP2A

This utility is used to copy the list of reports from the Permanent User Report List file to the Active User Report List file. Newly-made changes to the Permanent User Report List file are then reflected in the Active User Report list file. Each report copied to the Active User Report List file has an original scheduling date associated with it. The original scheduling date is passed as a parameter to the utility. If the parameter is omitted, the system date is used. For more details, see the CTDCP2A utility in the *INCONTROL for z/OS Utilities Guide*.

Running this utility more than once a day (for example, after a computer crash) does not create duplicate entries. You can run this utility before or after the New Day procedure.

## SEARCH Parameter

This is the recommended method for accessing the Permanent User Report List file. By setting parameter S (Search) in the report decollation mission definition, the relevant Permanent User Report List file entries are accessed during the decollation process to retrieve the values of the report parameters. For a description of parameter S (Search) in the DO USER statement, see the chapter about decollating mission parameters in the *Control-D and Control-V User Guide*.

## Utility CTDCA2P

Utility CTDCA2P copies newly generated report and user entries from the Active User Report List file to the Permanent User Report List file, which maintains the list of all reports that can be created at any specific time.



New report and user entries are created on the Active User Report List file when a new recipient is detected in a certain report (for example, when a new bank branch is opened). This entry has the default copy count of the report as defined in the report decollating mission. The utility copies the entries to the Permanent User Report List file, thereby automatically updating the User Report list on the Permanent User Report List file. It does not update User and Report entries that already exist in the Permanent User Report List file.

Utility CTDCA2P can be run more than once a day (for example, after a computer crash). Duplicate entries are not created.

It is recommended that the utility be run once a day, preferably before the New Day procedure is invoked.

## Active User Report List File

The Active User Report List file contains entries with the following report status:

- reports due to be decollated (in WAIT DECOLLATION status)
  - The user can change the copy count and print destination.
  - The user can add additional report recipients.

These entries are created by utility CTDCP2A.
- reports that are decollated but are waiting to be bundle printed (in WAIT PRINT status)
  - The user can view the reports.
  - The user can change the copy count, print destination and any other report characteristics.
- reports that are decollated but are not bundle printed (in DECOLLATED status)
  - The user can view the reports.
  - The user can issue an immediate print request.
- reports that have been printed (in PRINTED or PRINTED-WAIT BKP status)
  - The user can view the reports.
  - The user can issue an immediate print request.
- Control-V reports that are decollated but have not yet migrated from DASD storage, or reports that have been migrated after the last run of utility CTDDLRP (that is, reports in WAIT MIGRATE status)
  - The user can view the reports.
  - The user can issue an immediate print request.

The Active User Report list files may contain reports from more than one day. Therefore, these files can contain more than one entry for each report, recipient, or category. Each entry is distinguished by its original scheduling date and its decollation date.

## Migrated User Report List File

The Control-V Migrated User Report List file contains a list of all migrated reports that have been deleted from DASD. These reports are in MIGRATED status. The user can

- view the reports
- issue an immediate print request
- separate the Migrated User Report List file to different partitions based on the CDAM creation date

The user can request that the Active User Report List screen display reports from the Active User file only, from the Migrated User file only, or from both User Report List files.

The Migrated User Report List files can contain reports from more than one day. Therefore, these files can contain more than one entry for each report, recipient, or category. Each entry is distinguished by its original scheduling date and its decollation date.

## Utility CTVCLMIG

This utility erases from the Migrated User Report List file all report entries for which the retention period has expired (that is, the number of days that the reports must be retained has passed). For relevant migrated media, the utility produces a list of tapes that can be freed for general use (that is, returned to the free tape pool).

Each report copied to the Migrated User Report List file has an original scheduling date associated with it.

This utility can be run before or after the New Day procedure and it can be run more than once a day (for example, after a computer crash). This utility must be run at least once a week.

For more information on the CTVCLMIG utility, see the *INCONTROL for z/OS Utilities Guide*.

## Utility CTDUFMDV

This utility separates the Migrated User Report List file to different partitions based on the CDAM creation date. The file can be implemented as one or as several IOA Access Method files, where each of these files is a separate partition of the Migrated User Report List file. With the ability to physically separate the file to different partitions, you can

- retain a very large number of report entries in the archive
- increase performance of report list requests for a large database
- increase performance of reorganization, index rebuild, CTVCLMIG, and other housekeeping utilities

Separating the existing Migrated User Report List file to different partitions should be done in several steps, as shown below:

Use the CTDUFDBF job in the Control-D JCL library to allocate and format new Migrated User Report List file partitions.

Modify the CTDUFMDV job according to the number of partitions you have allocated and formatted.

If the process of separating to partitions is performed first, the CTDUFMDV job should be submitted with the ACT (MIG / HST) parameter in order to propagate the CDAM creation date to all report entries that were created in releases earlier than version 6.3.xx.

Separate the existing Migrated User Report List file to the new Migrated User Report List file partitions according to the CDAM creation date.

The CTDUFMDV job must be submitted with the PART parameter.

If you continued working with Migrated User Report List file during the separation process, submit the CTDUFMDV job with the COPYNEW parameter to copy the NOTE records, which were created or updated during the separation process, to the new Migrated User Report List file.

Update the IOADSNL, ALCCTDJB, ALCCTV, and ALCDOLV members in the IOA PARM library, in accordance with the new Migrated User Report List partitions.

After the new partitions are created, new running migration missions and CTDDELRP will copy reports to the corresponding MUF partition according to the CDAM creation date.

For more information about the CTDUFMDV utility, see the *INCONTROL FOR z/OS Utilities Guide*.

## Utility CTDUFMPR

This utility reorganizes the Migrated User Report List file (MUF) partitions in place according to the new partition date ranges that are specified with the utility's input parameters.

The MUF can be separated into several partitions based on the CDAM creation date, by using the CTDUFMDV utility. The partitions date ranges are kept in the special MIGPART record, which is located in the main partition of the MUF. When Control-V works with a partitioned MUF, the new reports are usually migrated to the last (main) partition. As the main partition grows, periodically it is necessary to reorganize the MUF partitions according to the new partition date ranges. While this reorganization procedure can be performed using the CTDUFMDV utility, it requires additional space on the DASD for the new set of partitioned datasets, and the time necessary for rewriting all the MUF records to the new datasets. Using CTDUFMPR is more efficient, saving this additional overhead in space and time.

The CTDUFMPR utility reorganizes the MUF partitions inside the existing partitioned datasets. The records, which are located in the partitions that do not match the new partition date ranges, are moved to the appropriate partitions. The remaining MUF records are not moved. CTDUFMPR does not change the number of partitions.

The repartition process consists of following steps:

1. Run CTDUFMPR with the COPY function. The MUF records, which are located in the partitions that do not match the new date ranges specified in the SYSIN input parameters, are copied to the corresponding partitions. The copied records are not deleted from the original partitions in this step. The Control-D end users continue to work with the original copies of the records during this step. At the end of this step, the MIGPART record is updated with the new partition date ranges.
2. To enable end users to work with the new partitions distribution, do the following:
  - a. Send the modify command  

```
/F IOAGATE,MODASID MODAPPL D RMIGPART
```

to the IOA Application Server. This modify command causes the IOA Application Server to read the MIGPART record with the new partition dates. Then the Control-D/WebAccess end users can work with the new partitions distribution.
  - b. Restart Online Monitor and TSO users working with migrated reports. Then the 3270 terminal end users can work with the new partitions distribution.
  - c. If deferred printing from Migration User files is used, run the CTDBLXR utility with the MIG parameter. It rebuilds the Print Control records to point to the new location of the User records, which were copied during the CTDUFMPR COPY step.

3. Run CTDUFMPR with the DELETE function. The MUF records, which were copied to other partitions in step 1, are now deleted from the original partitions. For more information about the CTDUFMPR utility, see the *INCONTROL for z/OS Utilities Guide*.

### Synchronization of Control-V components with the repartition process

The Control-D/WebAccess and 3270 terminal end users can continue working with MUF during the entire repartition process. If any records, which were copied during repartition, are updated by end users in the old location, these records are copied to the new partitions by the COPY NEW process. The COPY NEW process automatically starts at the end of the COPY step and, again, immediately at the beginning of the DELETE step.

The Control-V components that perform massive updating of the MUF cannot work in parallel with the CTDUFMPR utility, while it is performing the COPY step. If any of these components are activated when the COPY is in progress, or if CTDUFMPR is started when one of these components is working with the MUF, an error message is issued and the job is not started.

The following components cannot work in parallel with CTDUFMPR during the COPY step:

- Migration missions
- CTDDLRP
- CTVCLMIG
- CTDUPBKP
- CTDUFUPD
- CTDUFEXP
- CTDRETC
- RSTRESET
- CTDBLXRP
- CTDUFPRT
- CTDAPRV
- CTDREPUS
- CTVDELI
- CTVUPGDB
- CTVGICHK

CTDUFMPR, with the DELETE function, can work in parallel with all Control-D components, except Restore Migrated missions. The CTDUFMPR DELETE step can be submitted only after the Restore Migrated missions, which were submitted before the end of the CTDUFMPR COPY step, are completed. If CTDUFMPR, with the DELETE function, is activated before such missions are completed, the utility stops with an error message.

## History User Report List File

The History User Report List file contains a list of all backed up reports that have been deleted from the disk. The site can control the time that the report is retained in the History User Report List file. The file also contains details about the storage media of the report data (compressed dataset name on disk, or volsers of tape or cartridge).

To view a report, the user must issue a report restore request from the History User Report List file. When the report restore request is performed, the user report entry is copied from the History User Report List file to the Active User Report List file by the restore mission as soon as the report is restored from tape to disk.

## Utility CTDDLRP

Control-D utility CTDDLRP scans the Active User Report List file for reports whose Active User Entry has expired. For reports meeting the specified selection criteria, utility CTDDLRP does the following:

- Flags reports, for which a backup or migration has been requested but not performed, as WAITING FOR BACKUP (or WAITING FOR MIGRATION).
- Moves the entry of each report, for which both backup and migration have been performed, from the Active User Report List file to both the History and Migrated User Report list files.

The entry of each report for which only migration has been performed is moved from the Active User Report List file to the Migrated User Report List file.

The entry of each report for which only backup has been performed is moved from the Active to the History User Report List file.

- Erases a report entry that is not requested to be backed up or migrated from the Active User Report List file.
- Erases the compressed dataset containing a report, for which the Active User Report List file has no entries, from DASD storage (if it does not contain data of other reports not yet erased).

Run this utility at least once a day, preferably after all backups have finished executing. For more information about the CTDDLRP utility, see the *INCONTROL for z/OS Utilities Guide*.

There is no harm in running the CTDDLRP utility more than once a day (for example, after a computer crash). You can run this utility before or after the New Day procedure.

## Utility CTDCLHST

This utility erases from the History User Report List file all entries belonging to reports for which the backup period has expired (that is, the number of days that the reports must be retained has passed). The utility produces a list of tapes that can be freed for general use (that is, returned to the free tape pool).

This utility can be run before or after the New Day procedure and it can be run more than once a day (for example, after a computer crash). This utility must be run at least once a week.

For more details, see the *INCONTROL for z/OS Utilities Guide*.

## Using Alternative Index Components

Alternative IOA indexes can be created for Active, Migration, and History User files, in addition to the corresponding regular IOA indexes.

With the ability to use alternative indexes, you can

- change native order of report entries in report list
- increase performance of report list requests

Control-D automatically chooses which index - primary or alternative - will be used for best performance for report list building under IOA online or Control-D/Page On Demand (POD).

Control-D automatically chooses the primary index if the SHOW RULES parameter is set to YES on the Show Options window of the User Reports Entry Panel.

An alternative index definition specifies the structure of an alternative index record, the first part of which is an index key. Each field in the index key corresponds to one of the predefined fields from a VSA user record, or part of such a field. When a user file is scanned by an alternative index, index records are retrieved and checked against selection criteria, after which the correspondent user records are read. Alternative indexes provide retrieval of a smaller number of index records and thus requires fewer user records to be read to create the same report list.

To use alternative indexes, Alternative Index Components of corresponding User Files should be created. An Alternative Index Component is an IOA AM file, which contains Alternative Index records in the same way that the primary Index component of a User file contains primary Index records.

## Naming convention of alternative index components

The naming convention for alternative index components is similar to regular indexes, but uses letters other than I. The naming convention for alternative index components is:

*Alt\_dbname = data\_dbname+alt\_letter*

where *alt\_letter* is the letter used for alternative index identification.

Examples:

- ACTJ – J is the alternative index component of Active User file
- ACTY – Y is the alternative index component of Active User file
- MIGJ – J is the alternative index component of Migrated User file
- MG1Y – Y is the alternative index component of Migrated User partition 1

## Creating alternative index components

1. Define the keys of the alternative index in the DEFAULTI member of the IOA INSTWORK library.  
Define a unique alternative index letter for the alternative index identification. The list and order of the keys should be fit to the most frequently used fields in the filter for a report list request.
2. Define the Alternative Index file in the DEF's members for Active, History, and Migrated User files of the IOA INSTWORK library.

The index key length defined in the KEYLEN field of the DEF's members should be equal to the sum of the key's length defined in DEFAULTI member +8.

If MUF partitions are used, the alternative index files should be created for all MUF partitions.

3. Use the CTDUFDBF job in the Control-D JCL library with parameter FUNC=INIT to allocate and format new alternative Active, History, and Migrated index files.
4. Stop all Control-D monitors, Control-D applications, IOA Archive Server monitors, and IOA online sessions.
5. Update the IOADSNL, ALCCTDJB, ALCCTD, ALCCTVJB, ALCCTV, and ALCDOLV members in the IOA PARM library, in accordance with the new alternative index files.
6. Activate the alternative index using the CTDUFANX utility with parameter FUNC=AD

An alternative index has the same structure for all User files and should be activated together for all Active Migration and History User files.

If MUF partitions are used, the alternative index files should be created for all MUF partitions  
D for each user file.

7. Build alternative indexes using CTDDIB utility with parameter ALT=ONLY for each user file.
8. Start all Control-D monitors, Control-D applications, IOA Archive Server monitors, and IOA online sessions.

## Deleting alternative index components

Use the CTDUFANX utility with parameter FUNC=DELETE to delete alternative indexes.

## Redefining key lists in alternative index components

1. Stop all Control-D monitors, Control-D applications, IOA Archive Server monitors, and IOA online sessions.
2. Deactivate the alternative index component.
3. Delete the alternative index component files.
4. Edit the DEFAULTI member.
5. Create the alternative index component with a new key list.
6. Start all Control-D monitors, Control-D applications, IOA Archive Server monitors, and IOA online sessions.

## Rebuilding alternative index components

Use the CTDDIB utility with parameter ALT to rebuild alternative index components.

## Checking alternative index components

Use the CTDDIG utility to check alternative index components.

For more information about the CTDUFANX, CTDDIB, and CTDDIG utilities, see the *INCONTROL FOR z/OS Utilities Guide*.

## Recommendations for defining Alternative Indexes

The use of Alternative indexes requires additional resources during User file updating, so Alternative indexes should be defined carefully to fit retrieval requests and achieve the desired aim.

Consider the following factors when choosing an index to be used:

- Number of index records to be retrieved to build the requested report list.
- Number of index records that will be rejected.
- Number of rejected user records.

The fields that can be used in Alternative indexes are listed in the description of the CTDUFANX utility, and can be divided into three groups:

- Fields that are specified as fixed values in selection criteria, such as Report Name, Job Name, Category, and so on.
- Date fields, which are specified as range in selection criteria.
- Recipient name, which can be multiplied, if SYNONYM or descendants are used in the recipient tree. This field is mandatory in an index key, because the recipient should always be checked against the recipient tree for security purposes.

To decrease the number of retrieved index records, the Alternative Index key should be composed of fields that are frequently specified in the selection criteria.

To make the index more effective, the first fields of the key should be fields of the group 1, if they are fully specified in the filter. The following field should be either a field from group 1, which is specified as prefix or a field from groups 2 or 3, depending on the implementation.

The fields that are specified as masks should be positioned at the end of Alternative Index key.

The order of the fields in the Alternative Index key should be defined so that the search process will have to go through the smallest number of records.

### Example 1 – Filtering by field with prefix

The end user specifies a Report name prefix ending with a wildcard character and a full value for Category in the filter.

The alternative index key should be composed of Category, Report name, and Recipient. In the CTDUFANX section of the *INCONTROL for z/OS Utilities Guide*, see Example 1.

All alternative index entries that have a key containing a specified Category, a Report name prefix, and any Recipient will be retrieved. Every entry will be checked to see if the Recipient field matches the specified recipient.



### Example 2 – Filtering by 'from' ODATE and 'to' ODATE

The end user uses a filter that contains 'from' and 'to' ODATEs, a fully specified Category, and Job name.

The alternative index key should be composed of Category, Job name, ODATE, and Recipient. In the CTDUFANX section of the *INCONTROL for z/OS Utilities Guide*, see Example 2.

The alternative index entries which have a key between value composed of specified Category, Job name, and 'from' ODATE and value composed of specified Category, Job name, 'to' ODATE and any Recipient will be retrieved. Every entry will be checked to see if the Recipient field matches the specified recipient.

The same results will be obtained if the alternative index is composed of Job name, Category, ODATE, and Recipient.

### Example 3 – Filtering by relative ODATE

The end user uses a filter that contains a relative ODATE and different combinations of Report name and Remark2 fields used with masks.

The alternative index key should be composed of ODATE, Report Name, Remark2, and Recipient. In the CTDUFANX section of the *INCONTROL for z/OS Utilities Guide*, see Example 3.

All alternative index entries for one calculated date will be retrieved.

Each entry will be checked to see if Report name and Remark2 match the specified masks. Any order of the Report Name and Remark2 and Recipient fields brings the same result.

## User Report List File Maintenance

You must perform the following steps when maintaining various User Report List files, usually on a daily basis:

Copy report definitions from the Permanent User Report List file to the Active User Report List file (utility CTDCP2A).

Copy the new user and report entries from the Active User Report List file to the Permanent User Report List file (utility CTDCA2P).

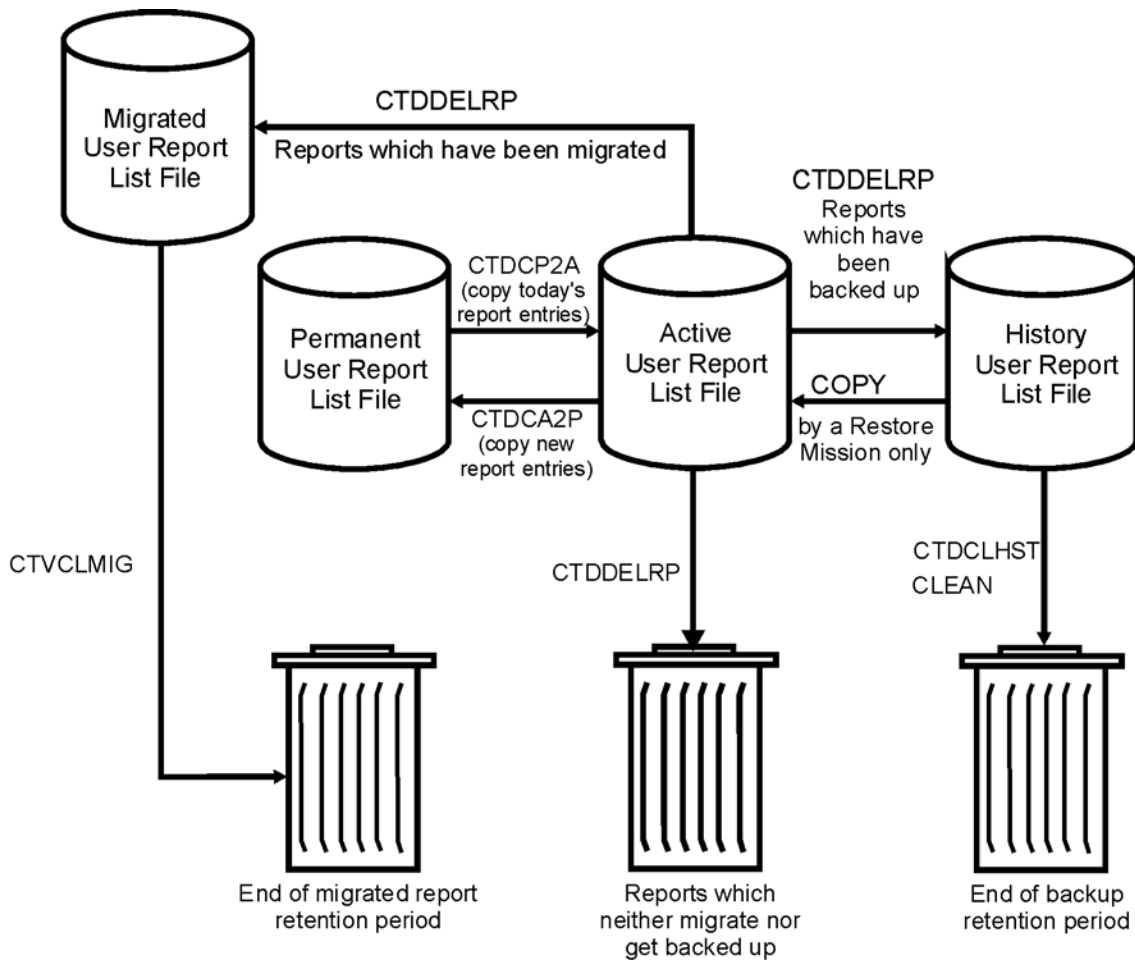
Erase old user and report entries from the Active User Report List file and erase their compressed datasets. Move or copy report entries from the Active User Report List file to the History User Report List file and/or the Migrated User Report List file (utility CTDDELRP).

Erase report information from the History User Report List file (utility CTDCLHST).

Erase report information from the Migrated User Report List file (Control-V utility CTVCLMIG).

The following figure shows the User Report File List Maintenance:

**Figure 67 User Report File List Maintenance**



## Repository Maintenance

The Control-D Repository consists of the following files:

- Active Missions file (AMF)
- Communications file (COM)
- Active Transfer file (ATF)
- User Report List files:

Active User Report List file

Permanent User Report List file

History User Report List file

Migrated User Report List file for Control-V

All the files are self-maintained by the New Day procedure or by utilities such as CTDDLRP and CTDC LHST. Self-maintenance is usually performed on a daily basis. Additional utilities are used for expanding file sizes, physical reorganization, and so on. This section details how to use these utilities.

## Expanding Control-D Files

The following Control-D files can be expanded using ICE:

- Active Mission File (AMF) (For the procedure, see the Control-D customization section in the *INCONTROL for z/OS Installation Guide: Customizing*.)
- Communication File (COM)
- Active Transfer File (ATF)

Perform the following steps to expand Control-D files:

1. Close all monitors. For example, to shut down the Control-D monitor, issue operator command `P CONTROLD`.
2. Rename the old file (that you want to expand).
3. Using ICE, select Customization. Enter CTD in the Product field, select Product Customization, and then select Major Step 6, "Customize Control-D Dataset Parameters." Perform the steps in order for each file you want to expand.
4. Perform minor step 1, "Customization Instructions," which provides an overview of the process.
5. Perform minor step 2, Control-D Dataset Parameters, which lets you specify values that ICE uses to calculate the appropriate file size. During this step, specify a question mark (?) in any parameter field for help. Modify only the parameters relevant for the files you want to expand
  - AMFSIZE for the Active Mission File;
  - COMSIZE for the Communication File
  - ATFBLK for the Active Transfer File.
6. Perform minor step 3, Save Parameters into Product Libraries, to save the parameter values that you specified in minor step 2.
7. Minor steps 4 through 6 run jobs that perform the expansion. Perform only those steps relevant to the files you want to expand.

## User Report List File Housekeeping

Perform the following User Report List file housekeeping activities as required:

- reorganize the files
- dynamically sort the Active User Report List File
- rebuild the Index component
- recover a damaged file

## Reorganizing the Files

The Data and Index components of an IOA Access Method file may extend beyond one physical dataset. When an IOA Access Method file extends to many physical datasets, processing may degrade due to fragmentation overhead. In this case, it is recommended that you reorganize the IOA Access Method file so that the primary and secondary extent datasets are larger. Perform the following steps:

1. Stop all Control-D related activities (Control-D monitor, online activities, batch utilities).
2. Run utility IOADUL to unload the contents of the Data component to a sequential file. For an example, see member CTDUFDEL in the Control-D JCL library.
3. Increase the value specified for parameter SPACE in the relevant DEFxxx and DEFxxxI definition members to specify larger primary and secondary extents. Change this parameter in the definition members of both the Index and Data components.
4. Delete all dataset extents of the Index and Data components. Perform this step with caution. For an example, see member CTDUFDEL in the Control-D JCL library.
5. Run the IOADBF utility with parameter FUNC=INIT to allocate and format the new file's components using the new parameters. Activate the utility twice, once for the Data component and a second time for the Index component. For an example, see member CTDUFDBF in the Control-D JCL library.
6. Run the IOADLD utility to reload contents of the data component from the sequential dataset previously produced by the IOADUL utility. Run the CTDDIB utility to rebuild the index component. For an example, see the CTDUFRST member in the Control-D JCL library.
7. Restart Control-D and all other related activities.

## Dynamic Sorting of the Active User Report List File

The Active User Report List file can be dynamically sorted by utility IOADBSR.

The Index component of the IOA Access Method file functions as a balanced tree index. The Control-D monitor can optionally sort the Data component of the Active User Report List file so that the physical order of the records is the same as the logical order of the Index component. This automatically provides increased I/O performance benefits for users of the Control-D Online Viewing facility and utilities such as CTDDLRP.

Dynamic sorting of the Active User Report list file does not inhibit the simultaneous execution of other Control-D activities, such as decollation, printing, backup and restore mission processing, or access to online user facilities.

Although dynamic sorting allows other processes to be performed concurrently on the same file components, INCONTROL for z/OS supplies a set of Sort Control parameters that can be specified to execute dynamic sorting at a time of day and at intervals when access to Control-D file components is at a minimum. Dynamic sorting is disabled by default. For a description of the Sort Control parameters and Dynamic sorting, see the IOADBSR utility and the ENABLE parameter in the *INCONTROL for z/OS Utilities Guide*.

Dynamic sorting of the Active User Report list file is enabled and controlled by the parameters specified in member DBSRTPRM in the Control-D PARM library (allocated to DD statement DASORTPR in the Control-D monitor's procedure JCL).

IOA Access Method files can also be sorted by executing utility IOADBSR as a batch job. For a description of the IOADBSR utility, see the *INCONTROL for z/OS Utilities Guide*.

## Rebuilding the Index Component

To rebuild the Index component, perform the following steps:

1. Stop all Control-D related activities (Control-D monitor, online activities, batch utilities).
2. Run the CTDDIB utility to rebuild the Index component from the Data component. For an example, see member CTDUFDIB in the Control-D JCL library.
3. Restart Control-D and all other related activities.

## Recovering a Damaged File

If dual mirror image file processing is used, it is possible to immediately recover a damaged file. The dual file is an exact copy of the main file. The recovery procedure uses utility IOADCPY to copy the entire dual file to the main file or vice versa. Before starting the recovery procedure, make a backup copy of the main file and the Dual file.

If the Main file is damaged, perform the following recovery steps:

1. Stop all Control-D related activities (Control-D monitor, online activities, batch utilities).
2. Delete all extents of the Data component of the main copy only. For example, to delete all the extents of the Active User Report List file, list all the files with prefix CTD.ACT.E\* and delete them.
3. Run the IOADCPY utility with parameter SUFFIX set to the Dual file (D000). For an example, see sample member CTDUFCPY in the Control-D JCL library.
4. Rebuild the Index component (see the preceding topic).
5. Restart all Control-D activities.

If the Dual file is damaged, perform the following recovery steps:

6. Stop all Control-D related activities (Control-D monitor, online activities, batch utilities).
7. Delete all extents of the Data component of the Dual copy only. For example, to delete all the extents of the Control-D Active User Report List file, list all the files with prefix CTD.ACT.D\* and delete them.
8. Run the IOADCPY utility with parameter SUFFIX set to the Main file (E000). For an example, see sample member CTDUFCPY in the Control-D JCL library.
9. Rebuild the Index component.
10. Restart all Control-D activities.

For more information about IOA Access Method utilities for User Report List files, see the *INCONTROL for z/OS Utilities Guide*.

## SMF Accounting

Control-D produces several types of SMF records that provide comprehensive accounting and chargeback information.

- An SMF record for each printed report is produced during deferred printing. The record number is specified in parameter SMF=nnn in member CTDPARM in the IOA PARM library. The record can be disabled by setting SMF to NO in member CTDPARM. The structure of the record is described in macro CTDSMF in the IOA MAC library. Control-D Exit CTDX006 receives each record before it is written to SMF files. The exit can change or add fields to the record.
- An SMF record can be produced for each printed report during immediate printing. This is triggered by Optional Wish WD0892 in member IOADFLT in the IOAENV library or IOADFLT in the PARM library. The record number and structure are identical to those provided for deferred printing.
- An SMF record describing activity of an online user is written during logoff operation performed under the IOA online monitor. The record contains CPU/EXCP consumed by the current user and also the number of operations performed by it (for example, print, restore, delete requests). The record is produced by IOA Exit IOAX006S. The desired record number must be set in the exit, which must be recompiled. The structure of the record is described by macro CTDSF1 in the IOA MAC library.
- An SMF record created during a decollation process contains the number of pages and lines processed by a decollation mission, the CPU utilized by it, the number of report entries built, and so on. The record is built by of Control-D Exit CTDX022D. Desired record numbers must be set in the exit, which must be recompiled. The structure of the record is described in macro CTDSF2 in the IOA MAC library.
- An SMF record is produced when each request from the IOASMON CDAM Archive Server completes execution. The SMF record number is specified in parameter SMF=nnn in the IOASPRM member in the IOA PARM library. Generation of this SMF record can be disabled by setting SMF=NO in the IOASPRM member. The structure of this SMF record is described in macro CTVSMF in the IOA MAC library. Control-V Exit CTVX002 receives each record before it is written to the SMF file. The exit can add or change fields in the record and can prevent the record from being written.

## Deleting IOA Access Method Files

When deleting IOA Access Method files (for example, for reorganization or reallocation with new SPACE parameters), delete all existing extents, not just the first (\*.E000) extent. Use job CTDUFDEL for this purpose.

# Control-O

## Overview

This chapter describes the initialization, customization, operation and administration features that are available for Control-O.

## Starting Control-O

Control-O is usually started at an early stage of the IPL process. Once initialized, Control-O can automate certain parts of the IPL process. To use Control-O for automating parts of the IPL process, member `COMMNDnn` (where `nn` is either the number specified in member `IEASYS` in `SYS1.PARMLIB`, or `00`) in the `SYS1.PARMLIB` library must contain the following command:

```
S CONTROL0, SUB=MSTR, OUTLIST=DUMMY[, ORDER=IPLRULES][, TYPE=IPL]
```

The `SUB` and `OUTLIST` parameters are required to start Control-O before JES has been brought up. The `ORDER` and `TYPE` parameters are optional. For more information about these parameters, and how and when to start Control-O, see [Recommended Organization Method](#) (on page 568).

If you do not plan to use Control-O to automate the IPL process, Control-O can still be started during IPL, after JES has been brought up, by adding the following command to member `COMMNDnn` in the `SYS1.PARMLIB` library:

```
S CONTROL0
```

It is also possible to manually issue the above mentioned operator commands.

CMEM users:

If Control-M is installed, Control-O assumes responsibility for the functions of the CMEM facility. Therefore, it is important to verify that the CMEM monitor (CTMCMEM) is down before the Control-O procedure is started.

For sites with CMEM rules that are to be implemented (triggered) in the early stages of the IPL process, command member `COMMNDnn` in `SYS1.PARMLIB` must contain the following command:

```
S CONTROL0, SUB=MSTR, OUTLIST=DUMMY[, ORDER=IPLRULES][, CMORDER=IOACMEML][, TYPE=IPL]
```

For more information about the parameters in the above statement, and how and when to start Control-O, see [Recommended Organization Method](#) (on page 568).

## Shutting Down Control-O

It is usually not necessary to shut down Control-O. However, if shutting down Control-O becomes necessary, it is recommended that the active Control-O monitor be replaced by starting a new Control-O monitor, as explained in [Replacing an Active Control-O Monitor](#) (on page 552).

It is possible to shut down Control-O with operator command `F CONTROLO,STOP` or `P CONTROLO`, but this is not recommended. Use an operator command to shut down Control-O only if a problem cannot be resolved by the replacement method. If operator command `F CONTROLO,STOP` or `P CONTROLO` is used, Control-O shuts down after a few seconds.

For CMEM users:

When Control-O is shut down, the CMEM facility is also shut down. To restart Control-O CMEM support after Control-O has been completely shut down, issue the following operator command:

```
S CONTROLO,TYPE=CTOCMEM
```

## Replacing an Active Control-O Monitor

When a Control-O monitor is started using operator command `S CONTROLO`, and a Control-O monitor is already active in the computer, the current Control-O monitor passes control to the new Control-O monitor and then shuts down. It is not necessary to reload the rule tables; they are passed from the current monitor to the new one.

To clean (erase) all Control-O tables from memory, shut down the Control-O monitor. This is not usually done, except in an emergency.

The following explains why it is not necessary to reload the rule tables:

- When Control-O is started, the user must tell Control-O which rule list to load. Control-O also loads the Global AutoEdit variable pools.
- When the user starts Control-O while Control-O is already active, the new Control-O inherits the rules and Global AutoEdit variables that were in use by the previous Control-O. It also inherits the subsystem and extended MCS consoles that the first Control-O allocated, and uses the areas in the Extended Common Service Area (ECSA) allocated and linkage index (for cross memory services).
- The user does not lose settings from the previous Control-O session when one Control-O is replaced by another.

This mechanism is used in the following situations:

1. When one of the monitor subtasks has an error (internal error or an abend), the Control-O monitor automatically attempts to recover. It tries to replace the old monitor with a new one, without stopping its activity. Control-O performs this process only one time. If another error occurs, Control-O is then terminated.
2. If starting Control-O before JES, start it with `SUB=MSTR`. A started task with `SUB=MSTR` has no SYSOUTs. When JES is up and running, it is recommended to replace the first Control-O with a new one, so the monitor is a normal started task with SYSOUTs.
3. To apply maintenance or a specific PTF to the Control-O monitor (after a SMP/E apply is done), start a new monitor without stopping the old monitor, so that all of the monitor's internal modules are refreshed.

Note: The Control-O executor modules that were loaded into ECSA (CTOWTO and CTOAIDT) are not refreshed in this manner. Control-O modules can be refreshed by issuing a new `MODIFY` command to Control-O (`RELOAD=CTOWTO`, `CTOAIDT`, and so on).

When Control-O is active for many days, it is recommended to refresh the monitor for the following reasons:

- Storage fragmentation may occur in the Control-O address space.



- The JOBLOG and SYSPRINT may become lengthy and difficult to follow.

This process is known as swapping Control-O monitors.

Note: Storage in ECSA, allocated by the first Control-O, is used by the new Control-O. This storage is displayed as orphan storage on the ECSA monitor, in OMEGAMON for MVS, BMC's MAINVIEW or TMON for MVS. The customer must not release these areas, because doing so may damage the system and cause an IPL

## Replacing the Active Control-O Executor Modules

When the active Control-O monitor is replaced, most Control-O modules are automatically reloaded. If maintenance is supplied for Control-O executors modules or the messages they use, a reload command can be used to replace the modules without stopping Control-O.

The following modules can be refreshed:

- CTOWTO, the Control-O executor module
- CTOAIDT, the CMEM executor module
- CTOJFRQ, the Control-O IEFJFRQ exit for JES2 command suppression and ON SYSOUT functionality
- messages used by these modules

Examples

To replace module CTOWTO, issue operator command

```
F CONTROL,RELOAD=CTOWTO
```

To replace the messages used by CTOWTO, issue operator command

```
F CONTROL,RELOAD=MESSAGES
```

## Replacing the Active UNIX for z/OS (OpenEdition) Interface Module (CTOAODT)

When the active Control-O Monitor is replaced, most Control-O modules are automatically reloaded. If maintenance is supplied for the UNIX for z/OS (OpenEdition) interface module (CTOAODT), this module must be reloaded separately.

All Control-O modify commands and their parameters are listed in [H Control-O Monitor and CMEM Modify Commands](#) (on page 848).

CTOAODT is shared among different IOA environments that are active in the system. Therefore, to replace the module, the current CTOAODT copy must be deactivated in all IOA environments on the system before a new copy can be loaded.

## Deactivating the Current Copy of CTOAODT

To deactivate the current CTOAODT copy in all IOA environments on the system, do the following:

1. Stop Unix for z/OS (OpenEdition) support by issuing the following operator command for the Control-O Monitor of every IOA environment on the system:

```
F monitor,STOPOE
```

2. Alternatively, stop the appropriate monitor.
3. Wait for either of the following messages to appear:

```
CME792I OPENEDITION INTERFACE MODULE REMOVED
```

```
CTO792I OPENEDITION INTERFACE MODULE REMOVED
```

After the CME7921 message or the CTO7921 message has been displayed, Unix for OS/390 (OpenEdition) has been stopped, and the new copy of CTOADT can be loaded.

## Loading the New Copy of CTOAODT

The procedure for loading the new CTOAODT copy in all IOA environments on the system is shown in the following steps:

1. Load the new module with the following operator command for the Control-O Monitor of the environment in which the PTF was applied:

```
F CONTROLO,STARTOE
```

2. Verify that the following message appears:

```
CTO781I OPENEDITION INTERFACE MODULE SUCCESSFULLY LOADED
```

3. Restore the OpenEdition support in the rest of the IOA environments where it was previously stopped, by running the following operator command for the Control-O Monitor of each one of them:

```
F monitor,STARTOE
```

4. Alternatively, restart the appropriate monitor if it was stopped.

## Automatic Restart Management (ARM) and CMEM

The Control-O monitor should not be defined for Automatic Restart Management (ARM) because

- Control-O has its own recovery process
- since Control-O is active on each system, there is no need to move it to another system when the original system becomes inactive.

## Control-O Rules

### Rule Types

In Control-O there are two types of rules

- Control-O rules that are created using the Control-O Rule Definition screen (option OR in the IOA Primary Option menu)
- CMEM rules that were are using the CMEM Rule Definition screen (option C in the IOA Primary Option menu) for triggering external events in Control-M

CMEM rules can contain only the following types of statements:

- ON JOBARRIV
- ON JOBEND
- ON DSNEVENT
- ON STEP
- DO FORCEJOB
- DO COND
- DO RESOURCE
- DO STOPJOB

CMEM rules can also contain DO SHOUT and DO RULE statements if Control-O is installed. CMEM tables cannot contain Control-O rules (that is, rules that contain statements other than the types listed above). The type of table (Control-O vs. CMEM) is determined by the way in which the table is loaded.

- CMEM rules are
  - loaded from DD statement DACTMLST
  - ordered or forced from the CMEM Rule Definition screen (Screen C)
  - loaded using modify command `F CONTROL O,C=LIB(table)`
- Control-O rules are:
  - loaded from DD statement DARULLST
  - loaded using modify command `F CONTROL O,O|F=LIB(table)`
  - ordered or forced from the Control-O Rule Definition screen (Screen OR)

If a rule is rejected because it is not compatible with the method used to load it, the following message is issued to the SYSPRINT SYSOUT of the Control-O monitor:

```
LDT54DE RULE TYPE IS INCORRECT. TABLE table LIBRARY library
```

When Control-O loads a table, it only replaces tables of the same type. To change the type of a table, the table must be deleted and loaded again. If table A is loaded as a CMEM table, it cannot be reloaded as a Control-O table. To load table A as a Control-O table, first delete table A by issuing operator command

---

```
F  CONTROL0,D=LIB(A)
```

---

For more information, see [Rule Loading Errors](#) (on page 562).

## Loading Rules

Control-O loads rules into ECSA only in the following situations:

- The Control-O instance is the first instance of Control-O started up in the IOA environment.
- The operator issues one of the following Control-O modify commands: F, O, or C.

The rule list is the list of rule tables loaded by Control-O during startup. The DD statements DACTMLST and DARULLST point to the rule list. To load all rules in the rule list only, issue one of the following Control-O modify commands:

```
F control0,O=ALL,REBUILD
```

```
F control0,F=ALL,REBUILD
```

where *control0* is the name of the Control-O monitor.

A user orders or forces the Control-O rules table from the Table list of the Rule Definition facility (screen OR), or from the CMEM Rule Definition facility (screen C).

During the load process, the monitor performs logical checks to verify the correctness of the rule.

In case of an error, the rule is rejected and an error message is sent to the IOA Log and the Control-O monitor DD statement SYSPRINT.

## Ordering Rules

After the rules are loaded in ECSA, Control-O orders them to facilitate proper triggering order, as follows:

**By priority**, from higher value to lower value

**Within the same priority**, in the order specified within the rule list

By rules that have **no priority** assigned

## Illustration of Rule Order

The following example illustrates how rules are organized for triggering.

Table A contains the following rules:

- A1, with priority 10
- A2, with no priority
- A3, with no priority

Table B contains the following rules:

- B1, with priority 10
- B2, with no priority
- B3, with priority 100

Table C contains the following rules:

- C1, with priority 10
- C2, with no priority
- C3, with no priority

The rules are triggered in the following order:

B3, A1, B1, C1, A2, B2, C2, C3

## Illustration of Rule Order After Loading a New Table

If you load a new table in ESCA (that is, one that is not included in the current rule list), the previous triggering order of the existing rules is maintained, and the new rules are added to the end of the appropriate priority level.

The following example illustrates how loading a new table affects the triggering order. A new table, D, is loaded after the tables in [Illustration of Rule Order](#) (on page 556) on page were loaded. Table D contains the following rules:

- D1, with priority 10
- D2, with no priority

The rules are now triggered as follows:

B3, A1, B1, C1, D1, A2, B2, C2, C3, D2

## Illustration of Rule Order After Reloading a Table

If you reload a table, the reloaded table replaces the original version of that table and the rules are replaced without affecting the previous priority and triggering order of the existing rules.

The following example illustrates the affect of reloading a table on the triggering order of the rules in the rule list. Table B is reloaded after Table D was loaded in [Illustration of Rule Order After Loading a New Table](#) (on page 557).

The rules are now triggered as follows:

B3, A1, B1, C1, D1, A2, B2, C2, C3, D2

Note that this is the same order as before the table was reloaded.

## Viewing the Rule Order

To view the rules by their load order, use screen 'OS', Control-O RULE STATUS in regular mode. To view the rules as shown by their priority order, enter the SORT primary command.

CMEM rules that are loaded from the rule list are loaded first with priority 100, so they are the first to be triggered.

ON RULE rules are loaded at the bottom of the list. They are organized in the same order but the search is in the opposite direction, from lower to higher priority.

## Automatic Loading of Rules

When Control-O is started, and it is not replacing an active Control-O monitor, it attempts to read a rule list from the member referenced by DD statement DARULLST. These are the rule tables to be automatically loaded by Control-O. The name of the member can be passed in the Control-O procedure parameter ORDER. The supplied default member, RULELIST, is in the Control-O PARM library. Each line in the list has the following format:

```
date library table {FORCE|NOFORCE|ORDER}
```

**Table 179**      **Format of Lines in Rule Table Member**

| Item           | Description                                                                                                                                                                                                                                                                       |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>date</i>    | Date of the rule. If a specific date is designated, it is used to analyze the Basic Scheduling parameters. The date format is mmddyy, ddmmyy, or yymmdd (depending on the site standard).<br><br>An asterisk (*) can be specified to indicate the current Control-O working date. |
| <i>library</i> | Rule library name.                                                                                                                                                                                                                                                                |
| <i>table</i>   | Rule table name (or mask).                                                                                                                                                                                                                                                        |

For every line in the list, Control-O loads the specified rule table from the specified library.

If either NOFORCE or ORDER is specified, each rule's Basic Scheduling parameters are compared to the specified date, or to the current Control-O working date if \* is specified. If the rule must be scheduled on that date, it is loaded by Control-O and activated.

If FORCE or no option is specified, each rule is loaded by Control-O and activated. Use this option when you do not want to use Control-O scheduling options.

Note: CMEM users: When Control-O is started (and it is not replacing an active Control-O monitor), it attempts to read the member referenced by DD statement DACTMLST. This member lists the CMEM rule tables to be automatically loaded by Control-O.

The name of the member containing the list of CMEM rule tables can be passed in parameter CMORDER of the Control-O procedure. The default member for the CMEM list is member IOACMEML in the IOA PARM library.

## Manual Loading of Rules

Member RULELIST contains a list of basic rule tables to be activated by Control-O as it is started. To load additional tables, or to replace a currently active table with a new (updated) copy of the rules in the table, use one of the options described in this topic.

### Option 1

Enter the Control-O Online facility and use the ORDER or FORCE option in the Table List screen (Screen OR).

### Option 2

Issue operator command

```
F CONTROLO,{O|F}=library(table)[,D=date]
```

**Table 180 Fields for Manual Loading of Rules**

| Item           | Description                                                                                                                                                                 |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| O              | Order. Each rule's Basic Scheduling parameters are compared to the specified date. If the rule must be scheduled on that date, it is loaded by Control-O and activated.     |
| F              | Force. Each rule is loaded by Control-O and activated, regardless of Basic Scheduling parameters. Use this option when you do not want to use Control-O scheduling options. |
| <i>library</i> | Rule library name.                                                                                                                                                          |
| <i>table</i>   | Rule table name (or mask).                                                                                                                                                  |
| <i>date</i>    | Scheduling date (optional). If no date is specified, the Control-O working date is used. Date format is mmddyy, ddmmyy, or yymmdd (depending on the site standard).         |

All of the Control-O modify commands and their parameters are listed in [H Control-O Monitor and CMEM Modify Commands](#) (on page 848).

## Examples

### Example 1

```
F CONTROLLO ,F=CTO . PROD . RULES ( CICSPROD )
```

Loads table CICSPROD from CTO.PROD.RULES.

### Example 2

```
F CONTROLLO ,F=CTO . PROD . RULES ( * )
```

Loads all tables from CTO.PROD.RULES.

### Example 3

```
F CONTROLLO ,F=CTO . PROD . RULES ( PROD* )
```

Loads tables whose names start with PROD from CTO.PROD.RULES.

### Example 4

```
F CONTROLLO ,F=CTO . PROD . RULES ( ?CICS* )
```

Loads tables whose names start with any character followed by the string "CICS" from CTO.PROD.RULES.

If the table has already been loaded by Control-O, the new copy of the table replaces all the rules of the table active under the Control-O monitor.

If you want to replace all the tables under Control-O with the list of tables specified in DD statement DARULLST, use operator command

```
F CONTROLLO , O|F=ALL [ ,REBUILD]
```

If you specify ALL, each table is ordered or forced according to its FORCE/NOFORCE specification in the rule list as defined in DD statement DARULLST.

If you specify the REBUILD option, all previously loaded rules are deleted. This option must be specified when using calendar-dependent rules.

If you omit the REBUILD option, previously loaded rules are either replaced by new copies of the rules or left unchanged.

The CMEM table is reloaded automatically when ALL is specified.

The process of loading the rule is performed by the Control-O monitor. The user must then check the result of the process in the IOA Log and in the Control-O monitor SYSPRINT.



## Manual Loading of CMEM Rules

The member referenced by DD statement DACTMLST during startup contains a list of CMEM rule tables to be automatically ordered by Control-O when it is started.

To load additional tables, or to replace a currently active table with a new (updated) copy, use one of the options described in this topic.

### Option 1

Enter the CMEM Online facility (=C), and use the FORCE option in the Table List screen.

### Option 2

Issue operator command

```
F  CONTROL0,C=library(table)
```

**Table 181 Fields for Manual Loading of CMEM Rules**

| Field   | Description                                                                                                                |
|---------|----------------------------------------------------------------------------------------------------------------------------|
| C       | Indication that CMEM rules are to be loaded. Each CMEM rule in the specified tables is ordered by Control-O and activated. |
| library | Rule library name.                                                                                                         |
| table   | Rule table name (or mask).                                                                                                 |

## Examples

### Example 1

```
F  CONTROL0,C=CTM.CMEM.RULES(DATASET)
```

Loads table DATASET from CTM.CMEM.RULES.

### Example 2

```
F  CONTROL0,C=CTM.CMEM.RULES(*)
```

Loads all tables from CTM.CMEM.RULES.

### Example 3

```
F  CONTROL0,C=CTM.CMEM.RULES(BKP*)
```

Loads tables whose names start with BKP from CTM.CMEM.RULES.

#### Example 4

```
F CONTROL O , C=CTM.CMEM.RULES ( ?CICS* )
```

Loads tables whose names start with any character followed by the string "CICS" from CTM.CMEM.RULES.

If a specified CMEM table has already been loaded by Control-O, the new copy of the CMEM table replaces all the rules of the table active under the Control-O monitor.

#### Example 5

The following operator command affects CMEM rules as well as Control-O rules:

```
F CONTROL O , O | F=ALL [ , REBUILD ]
```

This command affects CMEM rules in the following way:

- When ALL is specified, all CMEM rule tables defined in the CMEM list member referenced by DD DACTMLST are reloaded.
- When REBUILD is specified, all previously loaded CMEM rules are deleted as well as the Control-O rules.

If REBUILD is not specified, previously loaded CMEM rule tables are either replaced by new copies or left unchanged.

## Deleting (Deactivating) an Active Rule Table

To deactivate an active rule table, use an operator command such as

```
F CONTROL O , D=CTO.PROD.RULES ( CICSPROD )
```

A single rule can also be deleted or held using appropriate line commands in the Rule Status screen.

## Rule Loading Errors

When loading CMEM or Control-O rule tables, error message LDT54DE is issued when

- loading a CMEM table that contains one or more Control-O rules
- loading a CMEM table as a Control-O rule table
- loading a Control-O rule table as a CMEM table

These errors and the corrective action that must be taken are described in more detail below. If one of these errors occurs, the specified table is rejected and the following error message is issued to the SYSPRINT SYSOUT of the Control-O monitor:

```
LDT54DE RULE TYPE IS INCORRECT. TABLE tablename LIBRARY libname
```

**Table 182 Fields in Error Message LDT54DE**

| Field           | Description                                  |
|-----------------|----------------------------------------------|
| <i>tablname</i> | Name of the rule table.                      |
| <i>libname</i>  | Name of the library where the table resides. |

## Loading a CMEM table that contains one or more Control-O rules

CMEM tables can only have rules that contain the following types of statements: ON JOBARRIV, ON JOBEND, ON DSNEVENT, ON STEP, DO FORCEJOB, DO COND, DO RESOURCE, and DO STOPJOB. If Control-O is installed, CMEM tables can also have rules that contain DO SHOUT and DO RULE statements.

If a user loads a CMEM table that has a rule that contains an invalid statement type, an error occurs. To resolve the error, the user must do one of the following:

- Remove the invalid rule from the CMEM table and reload the CMEM table
- Delete the table from Control-O, then reload the table as a Control-O rule table using the Control-O Rule Definition screen (option OR on the IOA Primary Option menu), or using modify command `F CONTROL O,O|F=LIB(table)`

## Loading a CMEM table as a Control-O rule table

- CMEM tables are created using the CMEM Rule Definition screen (option C in the IOA Primary Option menu). When they are loaded into Control-O, they are identified as CMEM tables.
- To load the rules in a CMEM table as a Control-O rule table, delete the CMEM table from Control-O and reload the table as a Control-O rule table.

Although CMEM rules can be executed from Control-O rule tables, these rules must be reloaded as Control-O rule tables.

## Loading a Control-O rule table as a CMEM table

- Control-O rule tables are created using the Control-O Rule Definition screen (option OR in the IOA Primary Option menu). When they are loaded into Control-O, they are identified as Control-O rule tables.
- If a Control-O rule table contains only statements that are valid as CMEM rules, that table can be loaded as a CMEM table by deleting the Control-O rule table from Control-O and reloading the table as a CMEM table.

## Reloading Rule Tables

### Reloading a CMEM table as a Control-O rule table:

1. Delete the CMEM table from Control-O.
2. Reload the rule table from the library using the Control-O Rule Definition screen (option OR in the IOA Primary Option menu) or using modify command `F CONTROLO,O|F=LIB(table)`

### Reloading a Control-O rule table as a CMEM table:

1. Delete the table from Control-O.
2. Reload the rule table from the library using the CMEM Rule Definition screen (option C in the IOA Primary Option menu) or using modify command: `F CONTROLO,C=LIB(table)`

## Private REGION Requirements of the Control-O Monitor

Control-O monitor procedure CONTROLO is supplied with a default region size of 5 MB. The region size can optionally be increased to a maximum of 2 GB.

## Calculating Region Size

You must include the following items in your calculation of the amount of virtual storage needed by the Control-O monitor:

- block size of the IOA Conditions file (fixed at 32,760)

The storage chunks allocated for this requirement are above the 16 MB line.

- number of records in the Message Statistics file, specified in parameter STREC# in member CTOPARM
- the monitor that loads the used records of the Message Statistics file into virtual storage

Each entry of the Message Statistics file requires 100 bytes. For example, if there are 5000 entries in the Message Statistics file, the Control-O monitor needs a maximum of 500 K of virtual storage to load the necessary records. The storage chunks allocated for this requirement are above the 16 MB line.

- Control-O monitor working buffers, which require approximately 65000 K of virtual storage

The storage chunks allocated for this requirement are mostly above the 16 MB line.

- Control-O monitor software, which requires approximately 2000 K of virtual storage, depending on the environment and the functions used
  - The storage chunks allocated for this requirement are both above and below the 16 MB line.
  - Site-defined work areas and programs (for example, user exits). These items usually require a small amount of virtual storage. Therefore, it is usually not necessary to calculate the requirements of site-defined components precisely. However, it is important that you allow some extra storage space for these components. The storage chunks allocated for this requirement are both above and below the 16 MB line.

You should specify a larger than necessary region size to ensure sufficient storage space for Control-O and related MVS activities.

## Example

A site has the following:

- a block size of 32760 for the IOA Conditions file
- 32 slots per block (CNDREC#)
- 5000 records in the Message Statistics file
- site-defined components requiring approximately 0.20 MB of virtual storage

Calculate virtual storage for the Control-O monitor as illustrated in the following tables:

**Table 183 Virtual Storage (below the 16 MB Line)**

| Component                      | Size    |
|--------------------------------|---------|
| Control-O software             | 1.00 MB |
| Control-O working buffers      | 1.00 MB |
| Site-defined components        | 0.20 MB |
| Extra space for MVS activities | 0.20 MB |
| Total                          | 2.40 MB |

**Table 184 Virtual Storage (above the 16 MB Line)**

| Component                      | Size     | Formula                                                          |
|--------------------------------|----------|------------------------------------------------------------------|
| IOA Conditions file            | 34.00 MB | $(32,760 * 32 \text{ days} * 32 \text{ slots per record}) + 64K$ |
| Control-O software             | 1.00 MB  |                                                                  |
| Message Statistics file        | 0.50 MB  |                                                                  |
| Control-O working buffers      | 5.50 MB  |                                                                  |
| Site-defined components        | 0.20 MB  |                                                                  |
| Extra space for MVS activities | 0.20 MB  |                                                                  |
| Total                          | 41.40 MB |                                                                  |

## Troubleshooting

MVS allocates the region size specified for the Control-O monitor unless a local exit (for example, IEALIMIT, IEFUSI, or another MVS or JES exit) is used to limit the region size of jobs and/or started tasks at the site.

Depending on the value of the REGION parameter in the EXEC statement, some MVS versions determine and calculate the amount of the allocated region above the line. In case of doubt, see the EXEC statement in the *JCL Reference Guide* for your operating system level.

Message IEF374I in the third SYSOUT of the Control-O monitor indicates the amount of virtual storage used by the Control-O monitor. Compare the information in this message with the existing region size definition.

- If sufficient virtual storage is not available for the Control-O monitor, use on-site performance tools to determine if the specified region size was rejected by MVS (for example, using a local exit).
- If MVS accepted the specified region, recalculate the Control-O monitor's virtual storage requirements, as shown above, and modify the region size in the EXEC statement of the Control-O monitor procedure accordingly.
- If an MVS procedure rejected the specified region size, contact your system administrator.

## Storage Allocation

At startup, the Control-O monitor allocates working storage. Control-O can allocate most virtual storage above the 16 MB line. The decision as to whether to allocate above or below the 16 MB line is made by MVS, which considers the specified job, the amount of requested storage, MVS exits, and so on.

## Structure of the IOA Conditions File

For information about the structure and space requirements of the IOA Conditions file, see the section that discusses the structure of the IOA Conditions File in the *INCONTROL for z/OS Installation Guide: Installing*.

## Control-O Usage of the Common Service Area (CSA and ECSA)

Control-O receives control for processing events under the various tasks in the system, that is, Control-O acts as part of the address space that issued the corresponding message, command, or other event. For that reason, some of the code and data that are in use by Control-O reside in common storage, accessible from all address spaces, as outlined below. Most of this common storage is above the 16MB line, in the ECSA, but a small portion is allocated by Control-O below the 16MB line, in the CSA, due to MVS services requirements.

Use the information in [ECSA Usage \(Above the 16 MB Line\)](#) (on page 567) and [CSA Usage \(Below the 16 MB Line\)](#) (on page 568) to calculate Control-O ECSA and CSA storage requirements.

## ECSA Usage (Above the 16 MB Line)

The table describes the Control-O components that use ECSA.

**Table 185**      **ECSA Usage (Above the 16 MB Line)**

| Component                 | Size           | Description                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subsystem executor        | 250 K          |                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Wait elements             | 160 K          | By default, the Control-O monitor allocates 20 wait elements of 8 K each, in internal control blocks called PNDs. The number of allocated PND buffers can be overridden with the WAITPR# parameter of the Control statement in CTOPARM. For further information on the PND# parameter see the <i>INCONTROL for z/OS Installation Guide: Installing</i> and <i>NCONTROL for z/OS Installation Guide: Customizing</i> . |
| Work Buffers              | 480 K          | By default, the Control-O monitor allocates 20 work buffers of 24 K each, in internal control blocks called WSCs. The number of allocated WSC buffers can be overridden with the WSC# parameter of the Control statement in CTOPARM. For further information on the WSC# parameter see the <i>NCONTROL for z/OS Installation Guide: Installing</i> and <i>NCONTROL for z/OS Installation Guide: Customizing</i> .     |
| Rules                     | 50 K           | This amount assumes 500 rules and an average of 100 bytes per rule.                                                                                                                                                                                                                                                                                                                                                   |
| XES preallocated buffers  | 3000 K         | Preallocated buffers for XES operations. (The value of 3000K is appropriate for a system with 4 CPUs. The approximate value for 8 CPUs is 6000K, for 16 CPUs 12,000K, and so forth.)                                                                                                                                                                                                                                  |
| Request Queue Chain (RQC) | 11280 K        | By default Control-O allocates 20,000 RQC elements which are needed for inter process communication between Control-O components. The size of each element is 564 bytes.                                                                                                                                                                                                                                              |
| <b>Total</b>              | <b>15220 K</b> | For a system with 4 CPUs.                                                                                                                                                                                                                                                                                                                                                                                             |

## CSA Usage (Below the 16 MB Line)

The table describes the Control-O components that use CSA.

**Table 186 CSA Usage (Below the 16 MB Line)**

| Component                           | Size   |
|-------------------------------------|--------|
| SWT and other system control blocks | 1.5 K  |
| Dataset triggering executor         | 30.0 K |
| Unix for MVS interface              | 3.0 K  |
| ACS exit routines for SMS support   | 10.0 K |
| Total                               | 44.5 K |

## Control-O Usage of the Extended Link Pack Area

If you install ON SMS support, which implies the execution of a job that copies supporting programs for BMC libraries to the SYS1.LPALIB library, you have to allow for Extended Link Pack Area (ELPA) storage.

### ELPA Usage

**Table 187 ELPA Usage**

| Component                         | Size  |
|-----------------------------------|-------|
| ACS exit routines for SMS support | 2.0 K |

## Recommended Organization Method

The primary function of Control-O is to automate events and console operation. An especially important use of Control-O is the automation of system startup (IPL).



The following topics describe the recommended Control-O organization method for automating the IPL process. If you do not automate the IPL process, Control-O organization is simplified, because certain MVS-related restrictions need not be addressed. In this case, skip directly to [Rule Scheduling](#) (on page 572).

## System Definitions

The IOA subsystem name, as defined in IOA Installation parameter SUBSYS, must be the first subsystem name after the primary subsystem in the subsystem list (member IEFSSN $nn$  in SYS1.PARMLIB). This enables Control-O to control commands directed to other MVS subsystems before they are executed by these subsystems. However, to control JES commands before they are executed by JES, Control-O uses JES exits or an additional subsystem name, defined optionally in the Control-O installation parameters. For more information, see the JCMDSSN parameter in the Control-O chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

The subsystem name can be defined by using positional parameter IEFSSN $nn$  or by using the keyword parameter form of the IEFSSN $nn$  PARMLIB member.

When using the keyword parameter form, add a record to member IEFSSN $nn$  in the following format:

```
SUBSYS SUBNAME (xxxx)
```

where  $xxxx$  is the name of the subsystem specified in IOA installation parameter SSNAME.

For more information, see the IBM manual *MVS Initialization and Tuning Reference*.

The Control-O monitor must be started at an early stage of IPL. To do this, its procedure and included members should reside in a PROCLIB library specified in member MSTJCL $xx$  in the IEFPDSI DD statement, and a START command should be added to member COMMND $nn$  in the SYS1.PARMLIB library. To achieve this, do the following:

1. Make sure the IOA environment was installed using the IEFJOBS DD statement.
2. CTOTROLO, IOASET $xx$ , and IOAENV $xx$  procedures must reside in SYS1.PROCLIB or another PROCLIB specified in the MSTJCL $xx$  member in the IEFPDSI DD statement.
3. The JCLLIB from the CTOTROLO procedure in the IOA PROCJCL library referenced by the IEFJOBS DD statement in the MSTJCL $xx$  member should be removed (or commented out).
4. Member COMMND $nn$  in the SYS1.PARMLIB library (where  $nn$  is either the number specified in member IEASYS in the same library, or 00) must contain the following command as one of the first commands in the member:

```
COM= 'S  CONTROLO , SUB=MSTR , TYPE=IPL , ORDER=IPLRULES , OUTLIST=DUMMY '
```

The following Control-O and IOA files are allocated to the Control-O monitor:

- IOA LOAD library
- IOA Global Variables library (dynamically allocated)
- IOA Conditions file
- Calendar library
- PARM library
- Message Statistics file (dynamically allocated)
- Rules library (dynamically allocated)
- Automation Log file (dynamically allocated)

Because Control-O is started as part of IPL, you must either catalog all these files in the MVS Master Catalog, or specify the VOLSER and UNIT parameters for each of the files. The dynamically allocated files (for example, the Message Statistics file) must be in the Master catalog.

If you specified parameters VOLSER and UNIT for these files and you move the files to another disk, you must modify the Control-O procedure as well.

Ensure that a correct value is specified for the JESTYPE IOAPARM parameter. Do not leave it blank.

It is recommended that Control-O start and control the initialization of other system components (JES, VTAM, TSO, and so on).

The on-site enqueue manager must be up before any attempt is made by Control-O to update any IOA file. For more information, see the QNAME parameter in the IOA chapter, and the CTOQNAM parameter in the Control-O chapter, of the *INCONTROL for z/OS Installation Guide: Installing*.

## Use of Two Rule List Members

The ORDER parameter of the Control-O monitor specifies the name of a member containing the list of rules to be loaded by Control-O upon startup. The easiest organization method is using one list member containing all Control-O tables (for example, the supplied member RULELIST). This is the preferred method when Control-O does not control IPL. However, if Control-O controls IPL, it must be organized somewhat differently.

As your site's use of Control-O expands, it is possible that hundreds of operations rules are defined. Loading all of these operation rules can take time. Control-O does not start to analyze messages until it has finished loading all rules in the initialization rule list. Consequently, if the list is quite large, Control-O may not detect some of the messages and commands issued during the beginning of the IPL process.

To ensure analysis of all messages, it is recommended to place all rules that control the IPL process in a separate list. This list is loaded when Control-O is started by overriding the default list member name using parameter ORDER to designate member IPLRULES. Member IPLRULES must contain only the rule tables to be used during IPL. One of the rules in this member must load the remaining Control-O rule tables.

## Multiple Rule Table Lists for CMEM Rules

Parameter CMORDER specifies the name of the member that contains the CMEM list (that is, the list of CMEM rule tables to be loaded by Control-O upon startup). It is usually recommended that you list all CMEM rule tables in one list. The default name for the member containing this list is IOACMEML.

However, it is sometimes recommended that you list certain rule tables separately.

Control-O does not start to analyze CMEM events until it has finished loading all rule tables in the CMEM list specified using parameter CMORDER. If a large number of rules have been defined at your site, Control-O may not detect some CMEM events during the beginning of the IPL process.

To ensure detection of all CMEM events, it is recommended that you place CMEM rules to be triggered during the IPL process in a separate list in member IOAIPLCM, and that you specify this list using parameter CMORDER. Rule tables specified in this way are loaded and activated during the startup process.

## Replacing the IPL Control-O

Operation of Control-O involves processing phases that are implemented by starting separate Control-O monitors, each one replacing the previous one.

**Table 188 Phases for Replacing the IPL Control-O**

| Phase   | Description                                                                                                                                                                                                                                                                                                |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phase 1 | When Control-O is activated with SUB=MSTR during IPL, certain functions, particularly the debugging facilities, are inactive. This is because JES is not yet initialized and it is impossible to allocate a sysout file. For this reason, Control-O is started with parameter OUTLIST=DUMMY.               |
| Phase 2 | A simple Control-O rule can detect the JES initialization message and then restart Control-O without parameters. Table STARTSYS contains a sample rule that does this. The new Control-O automatically takes control from the previous Control-O used during IPL. It is not necessary to reload the rules. |
| Phase 3 | If Control-O controls the termination of JES, a third Control-O monitor, which does not allocate sysout files, is required during shutdown of the system. This third Control-O monitor must be started by a rule containing parameters SUB=MSTR and OUTLIST=DUMMY.                                         |

Parameter TYPE of operator command START CONTROLO enables you to specify the Control-O processing phase for a specific monitor. The following table lists the valid values for this parameter:

**Table 189 Values for Parameter TYPE**

| Value    | Description                                                |
|----------|------------------------------------------------------------|
| IPL      | The Control-O monitor controls the IPL process.            |
| REGULAR  | The Control-O monitor is a regular Control-O monitor.      |
| SHUTDOWN | The Control-O monitor controls the shutdown of the system. |

The Control-O TYPE is displayed in the following initialization message:

```
CTO147I      Control-O  INITIALIZATION  COMPLETE,TYPE=type,SUB=job-entry-subsystem
```

This message can be used by Control-O rules whenever phase-dependent processes are handled.

When Control-O is brought up to replace an existing Control-O monitor, it does not load rules from DD statement DARULLST. Instead, it takes control of the rules that were active under the previous Control-O monitor. Only a new operator command F CONTROLO,O=ALL loads the rules from DARULLST.

CMEM Users:

This note also applies to CMEM rules loaded from DD statement DACTMLST.

## Rule Scheduling

Control-O is usually started at an early stage of IPL and remains active until shutdown. Most rules behave the same on any date. However, it is sometimes necessary to schedule different rules for different dates. For example, you may want to trigger one response to a certain message on a regular working date and a different response to the same message on the first day of a month.

Under Control-O, you can define scheduling parameters for rules. For example, a rule can be scheduled for a specific date only. The scheduling criteria of rules are checked when a rule is ordered (either automatically or manually).

If a rule is subject to scheduling criteria, these criteria must be checked daily, and the rule loaded and activated only if it must be scheduled according to its scheduling criteria. You should reload rules on a daily basis using a time-initiated command (rule) that issues the following order command for all Control-O tables at a specified time of day:

```
F  CONTROLO ,O=ALL,REBUILD
```

## Displaying Active Rules

The Rule Status screen displays a list of all rules that have been ordered and their statuses. The displayed rules can be held or deleted or freed. Alternatively, enter operator command:

---

```
F  CONTROLO,DISPLAY
```

---

The list is sent to the console.

## Management of Control-O Facilities

This section contains descriptions of commands and considerations for managing various Control-O facilities and components. The following topics are discussed:

- message statistics facility
- automation log facility
- Control-O Status Monitoring System (COSMOS)
- rule operation mode
- global autoedit variables
- Control-O sleeping interval
- Control-O security cache
- problem determination

## Controlling the Message Statistics Facility

The Message Statistics facility allows accumulation and display of statistics for the messages or commands issued by the system on which Control-O is active.

The Message Statistics facility counts messages and commands by message or command ID. Each time a message or command is displayed, the counter for the corresponding entry in the Statistics file is incremented. When a new message ID or %\$STATID value is detected, a new entry is opened in the Statistics file.

Statistics accumulation is normally started automatically when Control-O is brought up. However, when necessary, accumulation of statistics can be controlled by the following operator commands:

- Stop statistics accumulation  
F CONTROLO,STOPSTAT
- This command can be used if statistical accumulation is no longer required or if it becomes necessary to reformat the Statistics file without bringing down Control-O.
- Start statistics accumulation  
F CONTROLO,STARTSTAT
- Reset statistics for all messages and commands  
F CONTROLO,RESETSTAT

All of the Control-O modify commands and their parameters are listed in [H Control-O Monitor and CMEM Modify Commands](#) (on page 848).

## Preventing Unnecessary Enlargement of Statistics Files

The Message Statistics facility counts messages and commands by message or command ID. The first word of the message or command is the message or command ID.

To prevent the Statistics files from becoming too large and to eliminate duplicate information, it may be appropriate to group messages or commands according to other criteria. It is useful, for example, to group messages or commands under one message or command ID when:

Messages start with free text. Accumulating each of these messages under a different message ID enlarges the size of the Statistics file, and may prevent the accumulation of meaningful statistics for the message.

Concatenation of JES2 commands with different operands results in separate statistics accumulation for each operand. For example, statistics for \$PJ05555 and \$PJ01234 are normally accumulated under different IDs even though both IDs refer to the same command.

Separate statistics are accumulated for messages that are not of interest to the user.

AutoEdit reserved variable %\$STATID can be used to specify the ID under which the messages or commands are accumulated. For example

```
ON COMMAND $P*
DO SET %$STATID=$P
```

Rule table STATS from the RULES library has been provided to perform the necessary grouping by %\$STATID. This table can be adapted and used according to site requirements.

## Handling Near-Full and Full Conditions for the Statistics File

When the Statistics file becomes more than 90% full, Control-O issues unrollable message CTO240W as a warning.

When Control-O detects that the Statistics file is full, it issues unrollable message CTO241E. Control-O then stops tracking statistics for new messages but continues to update the counters of messages already in the Statistics file.

If message CTO240W or CTO241E is issued, it is recommended that the operator enlarge the Statistics file using utility CTOCSF and check if messages can be grouped by %\$STATID.

## Controlling the Automation Log Facility

The Automation Log facility allows accumulation and display of automation information from all inputs available to Control-O.

The Automation Log facility is started automatically when parameter AUTOMLOG in member CTOPARM is set to V or D. For more information, see the Control-O chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

While Control-O is active, the Automation Log facility is controlled by the following operator commands:

- Stop Automation Log accumulation

```
F CONTROLLO,AUTOLOG=NO
```

This command can be used when the Automation Log is no longer required or when it becomes necessary to reformat or rebuild the Automation Log file without bringing down Control-O. Message CTO297I indicates that Automation Log accumulation has stopped.

The Automation Log can be viewed using Screen OL, even when Control-O is inactive or Automation Log accumulation has been stopped.

- Start Automation Log accumulation

```
F CONTROLLO,AUTOLOG=YES
```

Message CTO297I indicates that Automation Log accumulation has started.

When the Automation Log is not active, Control-O trace messages are written to the SYSOUT specified by DD statement DAACTLOG of the Control-O monitor.

## Determining the Size of the Log

The Automation Log is a wraparound dataset, which means that the number of records in the file is constant and, when the file is full, a new record overwrites the oldest record. Automation Log entries can be archived or backed up for subsequent retrieval using utility CTOALOCF. For more information, see the *INCONTROL for z/OS Utilities Guide*.

If backup is performed on a regular basis, the Automation Log must be large enough to prevent overwriting record that have not been backed up. The size of the Automation Log is specified in installation parameter ALREC#. The backup frequency depends on site requirements.

## Preventing Logging of Unnecessary Messages

Some messages may be unnecessary for a particular task. Use the System AutoEdit variable %\$AUTOLOG to control which messages are entered into the Automation Log. The table lists the valid values.

**Table 190 Values for AutoEdit Variable %\$AUTOLOG**

| Value   | Description                                      |
|---------|--------------------------------------------------|
| Y (Yes) | Record the message in the Automation Log.        |
| N (No)  | Do not record the message in the Automation Log. |

**EXAMPLE:** Prevent messages whose ID starts with TST from being written to the Automation Log.

```
ON MESSAGE TST*
DO SET %$AUTOLOG=N
```

## Writing to the IOA Log Facility

Installation parameter SMODE (Stand-alone mode) in member CTOPARM determines how requests to write to the IOA Log facility are handled. The following operator command can be used to temporarily override the value specified in this installation parameter:

```
F CONTROLLO,SMODE=x
```

where *x* equals F (Forced), Y (Yes), or N (No).

For a description of SMODE values, see the ICE Step 2.1 discussion of Control-O Operational Parameters, in the Control-O chapter of the *INCONTROL for z/OS Installation Guide: Installing*. If an invalid value is specified for SMODE=, the following message is generated:

```
MTO367E          SMODE VALID VALUES ARE F, Y, AND N
```

## Management of the Control-O Status Monitoring System (COSMOS)

The Control-O Status Monitoring System (COSMOS) is used to monitor the status of objects in the computing environment. When activated, COSMOS ensures that specified objects are maintained in their specified desired status.

Normally, COSMOS must be activated as part of the Control-O startup process.

While Control-O is active, the commands listed in the table can be used to control COSMOS operations.

**Table 191 Commands for Controlling COSMOS Operations**

| Command  | Description                                                                                                                                                                       |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COSINI   | Starts up the COSMOS facility.                                                                                                                                                    |
| COSTERM  | Shuts down the COSMOS facility.                                                                                                                                                   |
| COSBOUNZ | Recycles the COSMOS facility by bringing it down and then restarting it. This command also reloads all COSMOS databases, thus refreshing variables used during COSMOS operations. |
| COSUP    | Assigns all COSMOS-controlled objects a desired status of UP.                                                                                                                     |
| COSDOWN  | Assigns all COSMOS-controlled objects a desired status of DOWN.                                                                                                                   |

For more information about these and other COSMOS commands, see the online facilities chapter in the *Control-O/COSMOS User Guide*.



## Controlling Rule Operation Mode

The mode of operation (that is, the trace mode) for a rule is determined by parameter `MODE` in its rule definition. Sometimes it is useful to override the operation mode of all active rules and verify that events and actions are recorded in a particular way. For example

Ensure a full trace of all rules (that is, all events and actions are recorded) to facilitate analysis of the interaction between rules.

Record (trace) only the triggering of every rule.

Global trace operations are requested using the following operator commands:

- Activate a full trace

```
F CONTROLLO,LOG=ALL
```

All rules are fully traced as if they were defined with mode `LOG`. This operator command must only be used temporarily for specific tests, because extended use of full trace mode can adversely affect Control-O performance.

Trace rule triggering only

```
F CONTROLLO,LOG=TRIGGER
```

Only rule triggering is traced for all rules. However, rules defined with mode `LOG` are fully recorded.

- Restore the default operation mode (as defined in the rule definition) for each rule

```
F CONTROLLO,LOG=DEFAULT
```

All of the Control-O modify commands and their parameters are listed in [H Control-O Monitor and CMEM Modify Commands](#) (on page 848).

## Controlling USS Support

With z/OS v2.4, IBM introduced major changes and enhancements to the USS (Unix Services for z/OS, OpenEdition) environment to be part of the core of z/OS. Consequently, certain applications (such as IBM FTP) that converted to use the USS and as a result these applications stopped issuing allocation and deallocation messages to the JESYSMSG spool dataset.

Control-O provides a special interface to support dataset-triggering events originating from Unix for z/OS. Control-O automatically determines whether the Unix for z/OS interface must be installed, and no user action is required.

The Unix for z/OS interface is shared by all Control-O installations at the site and is version-independent. The first Control-O subsystem to initialize loads the Unix for z/OS interface module to common storage. This interface is later used by all other Control-O subsystems. Upon startup, every Control-O subsystem registers itself with the Unix for z/OS interface. This registration mechanism enables the Unix for z/OS interface to recognize all the available Control-O subsystems and to call them if an Unix for z/OS dataset-triggering event occurs.

When a Control-O subsystem shuts down, it removes itself from the Unix for z/OS interface. The last Control-O subsystem to shut down removes the Unix for z/OS interface from common storage.

The following sequences of messages indicate that the Unix for z/OS interface was successfully installed:

- for the first Control-O subsystem to initialize

```
CTO820I  INITIALIZATION OF OPENEDITION SUPPORT STARTED
CTO821I  OPENEDITION INTERFACE MODULE SUCCESSFULLY LOADED
CTO822I  SUBSYSTEM REGISTERED WITH OPENEDITION INTERFACE
CTO823I  INITIALIZATION OF OPENEDITION SUPPORT ENDED SUCCESSFULLY
```

for any subsequent Control-O subsystem

```
CTO820I  INITIALIZATION OF OPENEDITION SUPPORT STARTED
CTO822I  SUBSYSTEM REGISTERED WITH OPENEDITION INTERFACE
CTO823I  INITIALIZATION OF OPENEDITION SUPPORT ENDED SUCCESSFULLY
```

The following sequences of messages indicate that the Unix for z/OS interface was successfully deactivated:

- for any Control-O subsystem except from the last subsystem to shut down

```
CTO830I  DEACTIVATION OF OPENEDITION SUPPORT STARTED
CTO831I  SUBSYSTEM REMOVED FROM OPENEDITION INTERFACE
CTO833I  DEACTIVATION OF OPENEDITION SUPPORT ENDED SUCCESSFULLY
```

- for the last Control-O subsystem to shut down

```
CTO830I  DEACTIVATION OF OPENEDITION SUPPORT STARTED
CTO831I  SUBSYSTEM REMOVED FROM OPENEDITION INTERFACE
CTO832I  OPENEDITION INTERFACE MODULE REMOVED
CTO833I  DEACTIVATION OF OPENEDITION SUPPORT ENDED SUCCESSFULLY
```

Control-O enables the operator to start and stop the Unix for z/OS interface using the Modify operator command. Usually, there is no need to intervene with the default processing performed by Control-O. The following operator commands are available:

```
F  CONTROLO ,STARTOE
F ,CONTROLO ,STOPOE[ ,FORCE ]
```

The STARTOE command instructs a Control-O subsystem to restart the Unix for z/OS interface. This includes initializing the interface (if no other subsystem has initialized it) and/or registering the current subsystem with the Unix for z/OS interface. If the STARTOE command is issued for a subsystem that is already registered with the Unix for z/OS interface, the following message is generated:

**CT0828I SUBSYSTEM ALREADY REGISTERED WITH OPENEDITION INTERFACE**

The STOPOE command instructs a Control-O subsystem to deactivate the Unix for z/OS interface. This includes removing the current subsystem from the Unix for z/OS interface and removing the Unix for z/OS interface from common storage if no other subsystem is using it. If the STOPOE command is issued for a subsystem that is not registered with the Unix for z/OS interface, the following message is generated:

**MT0836W SUBSYSTEM NOT REMOVED FROM OPENEDITION INTERFACE: SUBSYSTEM NOT FOUND**

If the STOPOE command is issued when the Unix for z/OS interface is not installed, the following message is generated:

**MT0835W OPENEDITION INTERFACE MODULE NOT INSTALLED**

The STOPOE,FORCE command instructs Control-O to remove the Unix for z/OS interface from common storage even if one or more Control-O subsystems are still registered with it.

Control-O also provides Started Procedure CTOOEDSC. This procedure can be started from the console using the START command. Procedure CTOOEDSC acts like a STOPOE,FORCE command and removes the Unix for z/OS interface regardless of any registered subsystems. The STOPOE,FORCE command and procedure CTOOEDSC must be used only in case of emergency.

## Accessing AutoEdit Variables Globally

AutoEdit variables can be made available globally to Control-O (and other INCONTROL products) in one of the following two methods:

- using global members
- using the IOA Variable Database facility

Global members and databases are managed in different ways.

If a function mentioned in this chapter is applicable to both global members and variables databases, it is indicated in the description of that function.

When Control-O is started, it reads the global members and IOA databases and loads the global variables defined in those members and databases into memory. The list of members and databases to be loaded is specified in DD statement DAGLBLST of the Control-O monitor procedure.

The following topic describes file configuration for global members. For a description of file configuration for databases, see [IOA Administration](#) (on page 35).

## Global Members

Global members reside in global libraries. A different global library is used for each computer (SMF ID) on which Control-O operates. The global library name is composed of

- the prefix defined for Control-O operations files in the OLPREFO Control-O target library parameter
- the global identifier .GLB
- the string "CPU" followed by the SMF ID of the specified computer

CTO.Vxxx.GLB.CPUSYA

\$GLOBAL is usually the default global member. This member contains Control-O AutoEdit variables that are not assigned to specific global members, yet must be available globally. The member format is identical to the format of a Control-M AutoEdit variable member. Therefore, Control-O global members can be referenced by Control-M jobs using MEMSYM and LIBSYM parameters.

In contrast, global variables created and accessed using the IOA Variable Database facility cannot be accessed by Control-M jobs using MEMSYM and LIBSYM parameters. For Control-M to access these variables, you must explicitly state its path name and variable name in job definition statements such as SET VAR and DO SET. For more information, see [IOA Administration](#) (on page 35).

Updates or additions to global variables (by rules or KOA scripts) are kept in memory by Control-O and are available to all other rules. While Control-O is active, global variables can be reloaded from, or written back to, the PDS (partitioned dataset) global library, in total or by member name, using operator commands LOADGLOBAL and WRITEGLOBAL. When Control-O is stopped, the global variables are written back to their respective partitioned datasets.

## Loading Global Variables

Use the following operator command to load global variables from a global member (or an IOA variable database) into Control-O memory:

```
F  CONTROLO , LOADGLOBAL [ =memname ]
```

where *memname* indicates the global members (or variable databases) to be loaded. The table lists the valid values.

**Table 192 Values for Loading Global Variables**

| Value       | Description                                                                            |
|-------------|----------------------------------------------------------------------------------------|
| <i>name</i> | Name of a specific global member (or variable database) to load.                       |
| ALL         | Load all global members (and variable databases) listed in the DAGLBLST concatenation. |

If no *memname* value is specified with a LOADGLOBAL command, only member \$GLOBAL (that is, the default global member) is loaded.

## Updating Global Variables

Use the following operator command to update global members (or databases) with the current status of the global variables in memory:

```
F  CONTROLO , WRITEGLOBAL [ =memname ]
```

where *memname* indicates the global members (or databases) to be updated. The following table lists the valid values:

**Table 193 Values for Updating Global Variables**

| Value | Description                                                                     |
|-------|---------------------------------------------------------------------------------|
| name  | Name of a specific global member (or database) to update.                       |
| ALL   | Update all global members (and databases) listed in the DAGLBLST concatenation. |

If no memname value is specified with a WRITEGLOBAL command, only the \$GLOBAL member (that is, the default global member) is updated.

## Defining a New Global Member

Rules related to a specific application can use their own global member to isolate their variables from the rules of other applications, to enable the use of checkpoints or to perform initialization on an application basis.

To define a new global member, create a member in the GLB library and add its name to the global member list (DAGLBLST).

The global member list (DAGLBLST) is referenced by DD statement DAGLBLST of the Control-O monitor procedure and usually resides in member DAGLBLST of the Control-O PARM library. Each line of the global member list describes a global member (or database).

### Format

```
member <attribute>
```

**Table 194 Fields for Global Member List Lines**

| Field         | Description                              |
|---------------|------------------------------------------|
| <i>member</i> | Name of the global member (or database). |

| Field            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>attribute</i> | <p>Type of global member (or database). Valid values:</p> <ul style="list-style-type: none"> <li>▪ INOUT - The member is loaded and updated using commands LOADGLOBAL and WRITEGLOBAL. For more information, see <a href="#">Loading Global Variables</a> (on page 580) and <a href="#">Updating Global Variables</a> (on page 580).</li> <li>▪ INPUT - The member can be loaded but cannot be written back. This option can be used for storing global variables whose initial values are specified in the member and do not require checkpointing. The value of each global variable can be changed and new global variables can be added to the member during the Control-O session, but these new values and new variables are not saved when Control-O is stopped.</li> <li>▪ PROT - The member cannot be updated during the Control-O session and no new global variables can be assigned to the member. This option can be used for a member containing global variables that are "constants" (for example, the messages of an application).</li> <li>▪ TEMP - The member does not reside on the disk and therefore cannot be loaded or written back. This attribute is useful for a member containing global variables that do not need to be saved after Control-O is stopped.</li> </ul> |

The following code contains sample content for the DAGLBLST member of the Control-O PARM library:

**Figure 68 Sample Content for Member DAGLBLST**

| \$Command | ====>                                                   | Scroll | ====> | CSR |
|-----------|---------------------------------------------------------|--------|-------|-----|
| 000001    | *****                                                   |        |       |     |
| 000002    | * ADD LIST OF POOLS                                     |        |       |     |
| 000003    | READONLY INPUT A READ-ONLY MEMBER                       |        |       |     |
| 000004    | * *****                                                 |        |       |     |
| 000005    | * * COSMOS RELATED POOLS *                              |        |       |     |
| 000006    | * *****                                                 |        |       |     |
| 000007    | *                                                       |        |       |     |
| 000008    | * DEMO DATABASES                                        |        |       |     |
| 000009    | *                                                       |        |       |     |
| 000010    | COSWORKV TEMP COSMOS - WORKING VARIABLES                |        |       |     |
| 000011    | COSALLPR DBINPUT COSMOS - DEMO PREREQUISITES DATABASE   |        |       |     |
| 000012    | COSALLMT DBINPUT COSMOS - DEMO METHODS DATABASE         |        |       |     |
| 000013    | COSSTCOB S1TEMP COSMOS - DEMO STC WORKING DATABASE      |        |       |     |
| 000014    | COSVTMOB S1TEMP COSMOS - DEMO VTAM WORKING DATABASE     |        |       |     |
| 000015    | COSIMG0B DBTEMP COSMOS - DEMO SYSIMAGE WORKING DATABASE |        |       |     |
| 000016    | COSSTCSD DBINPUT COSMOS - DEMO STC SOURCE DATABASE      |        |       |     |
| 000017    | COSVTMSD DBINPUT COSMOS - DEMO VTAM SOURCE DATABASE     |        |       |     |

```

000018 COSIMGSD    DBINOUT    COSMOS - DEMO SYSIMAGE SOURCE DATABASE
000019 *
000020 *          PROD DATABASES
000021 *
000022 * PRDALLPR DBINPUT    COSMOS - PROD PREREQUISITES DATABASE
000023 * PRDALLMT DBINPUT    COSMOS - PROD METHODS DATABASE
000024 * PRDSTCOB DBTEMP     COSMOS - PROD STC WORKING DATABASE
000025 * PRDVTMOB DBTEMP     COSMOS - PROD VTAM WORKING DATABASE
000026 * PRDSTCSD DBINPUT    COSMOS - PROD STC SOURCE DATABASE
000027 * PRDVTMSD DBINPUT    COSMOS - PROD VTAM SOURCE DATABASE
000028 *
000029 * *****
000030 * *          COSMOS SAMPLE DEFINITION FOR SYSPLEX-WIDE MANAGEMENT *
000031 * *****
000032 *
000033 *          DEMO DATABASES
000034 *
000035 * COSSTCOB S1TEMP     COSMOS - DEMO STC WORKING DATABASE FOR SYSPLEX
000036 * COSVTMOB S1TEMP     COSMOS - DEMO VTAM WORKING DATABASE FOR SYSPLEX
000037 * *****
000038 * *          TUTORIAL RELATED POOLS *
000039 * *****
000040 TUTORIAL    DBINPUT    TUTORIAL
000041 * *****
000042 * *          XAE TEST RELATED POOLS *
000043 * *****
000044 XAES1D01 S1TEMP     XESXAE - DEMO - S1 - TEMP
000045 * XAES1D02 S1INPUT    XESXAE - DEMO - S1 - INPUT
000046 * XAES1D03 S1PROT     XESXAE - DEMO - S1 - PROT (SAME AS DBPROT)
000047 * XAES1D04 S1INOUT    XESXAE - DEMO - S1 - INOUT (SAME AS DBINOUT)
000048 XAES2D01 S2TEMP     XESXAE - DEMO - S2 - TEMP
000049 XAES2D02 S2INPUT    XESXAE - DEMO - S2 - INPUT
000050 * XAES2D03 S2PROT     XESXAE - DEMO - S2 - PROT (SAME AS DBPROT)
000051 * XAES2D04 S2INOUT    XESXAE - DEMO - S2 - INOUT

```

Once the new global member (or database) has been defined and listed, it must be activated with the following operator command:

```
F CONTROLLO, LOADGLOBAL=member
```

where *member* is the name of global member (or database).

## Automatic Compression of the Global Library

Because of its PDS (partitioned dataset) organization, the global library is prone to D37 abends (insufficient space to write to disk). If, at your site, there is no product to keep the library compressed, Control-O enables you to automatically compress the global library whenever it becomes full, as explained below.

The Automatic Compression facility is normally activated when the global library is full (that is, when a D37 abend is encountered during a WRITEGLOBAL operation).

Before attempting to compress the global library, Control-O backs up the library to a sequential file using utility IEBCOPY. The name of the backup sequential file is the name of the specified global library with the suffix ".COPY". For example, when global library CTO.Vxxx.GLB.CPUSYSA is backed up, the resulting sequential file name is: CTO.Vxxx.GLB.CPUSYSA.COPY

The backup sequential file is allocated only if parameter GLBCOMP in member CTOPARM is set to Y (Yes), indicating that the global compress feature is required.

The Automatic Compression facility uses member \$\$COMPST of the global library to track the progress of the compression operation. \$\$COMPST is a single record member that is created automatically when the global library is defined.

For each step in the backup and compression process, variable %%STATUS in member \$\$COMPST is updated to reflect the status of the compression process. The following table lists the possible values for this variable:

**Table 195 Values for Variable \$\$COMPST**

| Value       | Description                                                                                                                               |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| %%STATUS=S1 | Backup of the global library has been started but not completed.                                                                          |
| %%STATUS=S2 | Backup of the library was successful. Compression has been started but not completed (that is, is either still in process or has failed). |
| %%STATUS=OK | Compression has been successfully completed.                                                                                              |

Whenever the global library is accessed (using a LOADGLOBAL or WRITEGLOBAL operation), the value of %%STATUS is checked to ensure that the library was not corrupted during the last automatic compress operation.

- If the value of %%STATUS is OK, the requested LOADGLOBAL or WRITEGLOBAL operation is performed.
- If the value of %%STATUS is S2, the Automatic Compression facility automatically restores the global library from the backup file and compresses it before execution of the LOADGLOBAL or WRITEGLOBAL operation.
- If the value of %%STATUS is S1, the global library and backup may be corrupt, and therefore the operation cannot be performed. An error message is issued.



## Enabling Automatic Compression

If automatic compression of the global library was not enabled at time of installation, you can enable it by performing the following steps:

1. Bring down Control-O.
2. Specify Y (Yes) for parameter GLBCOMP in member CTOPARM of the IOA PARM library.
3. Submit job NEWGLOB in the IOA INSTWORK library. This job
  - renames the old global library
  - defines a new global library (using the old library name) and a sequential backup file (used by the Automatic Compression facility)
  - copies the contents of the renamed global library to the new global library
 A job can be tailored by using the ICE activity "Tailor Job" from the Housekeeping menu.
4. Restart Control-O.

## Modifying the Control-O Sleeping Interval

Control-O wakes up every few seconds and checks on time-related events. This time interval is defined in Control-O installation parameters and can be changed by the system administrator. In addition, the interval can be modified by operator command

```
F CONTROLLO, INTERVAL=nn
```

where *nn* represents the interval in seconds.

If Control-M is active at your site, it is recommended that you specify an interval shorter than the Control-M sleeping interval.

It is recommended that the interval be modified by automatic commands that are invoked by the Control-O monitor itself, according to set conditions and time ranges, and not manually by the operator.

The optimal sleeping interval depends on the processing power of the machine. Depending on the processing power of the machine, the sleeping interval should usually not be less than the number of seconds indicated in the following table:

**Table 196 Sleeping Intervals per Machine**

| Machine                             | Sleeping Interval |
|-------------------------------------|-------------------|
| For machines with less than 20 MIPS | 10 seconds        |
| For machines with 20 to 50 MIPS     | 5–6 seconds       |
| For machines with over 50 MIPS      | 4 seconds         |

There is no practical benefit in setting the interval to less than the above minimum. Doing so can actually slow down the operation of Control-O.

When the modification is accepted by Control-O, the following message is displayed on the operator console:

---

CTO123I Control-O INTERVAL IS SET TO nn SECONDS

---

## Refreshing the Control-O Security Cache

Control-O security modules use a security block to identify each user for which an authority check is performed. The first time a user's security authorization is checked, Control-O creates a security block for that user. The security block can then optionally be saved for the next time the user's security authorization is checked.

Security blocks saved for subsequent checks are kept in the Control-O Security Cache. The size of the security cache is defined in the RUNTCACH parameter in member CTOPARM. If 0 is specified for the RUNTCACH parameter, no security blocks are saved. For information, see the RUNTCACH parameter in the Control-O chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

The Control-O Security Cache holds security blocks for only the last n users to have their security authorization checked, where n is the value specified for parameter RUNTCACH. For example, if parameter RUNTCACH contains a value of 10, the security cache holds a security block for each of the last ten users that were checked.

Changes made to a user's security authorization since the last time that user's security block was created are not automatically included in the information in the user's security block in the Control-O Security Cache. However if a user's security authorization has been changed, and there is no security block in the Control-O Security Cache for that user, changes made to the user's security authorization are put into effect the next time that user's security authorization is checked.

To immediately include new user authorization information in the Control-O security cache, refresh the security cache using operator command

---

F CONTROL0,NEWSECDEF

---

This command refreshes all user authorization information in the Control-O security cache.

When the modification is accepted, the following message is displayed on the operator console:

---

CTO251I RUNTIME SECURITY REFRESH ENDED OK

---

## Problem Determination

Control-O is supplied with internal debugging (trace) facilities that provide the ability to print an internal debugging trace and to print the contents of Control-O internal data areas. Under normal circumstances, the trace facilities are dormant. However, if required (that is, if BMC Customer Support has requested debugging information), you can activate the trace facilities by performing the following steps:

Do one of the following:

1. Start a new Control-O monitor with the following operator command:

```
S CONTROL0,TRACE=level
```

The Control-O monitor passes control to the new Control-O monitor and shuts down.

2. Issue the following operator command:

```
F CONTROL0,TRACE=level
```

The required trace level is supplied by BMC Customer Support. It can be any value from 000 to 255 (000 specifies no debugging).

You should not regularly activate Control-O with the TRACE parameter, because a JES problem may cause Control-O to become suspended while waiting for JES.

Debugging information is printed to files referenced by DD statements DATRACE and DADUMP of the Control-O procedure.

- When you finish your problem determination procedures, start a new Control-O using operator command

```
S  CONTROLO
```

or specify operator command

```
F  CONTROLO,TRACE=00
```

## Print Control-O Internal Data Areas

To print a snapshot of Control-O internal data areas, issue operator command

```
F CONTROLO,SNAP[=name1,name2 .....namen]
```

where *name1, name2,.... namen* are the names of the Control-O internal data areas.

When no name is specified, all data areas are printed. Your BMC Customer Support can provide you with the list of data area names, and can specify which areas must be printed depending on the problem encountered.

**Table 197 Valid Values for Data Areas**

| Value   | Value  | Value   | Value  | Value   | Value  | Value  |
|---------|--------|---------|--------|---------|--------|--------|
| ALL     | DLY    | MTOLNK  | MTOWSC | RQCALO  | RQCSTO | STO    |
| ALO     | EXO    | MTOMIX  | MVS    | RQCDLY  | RQH    | SWT    |
| CAS     | LINK   | MTOMPT  | OMT    | RQCEXO  | RULES  | SYS    |
| CDT     | MAIN   | MTOPLB  | OPR    | RQCFREE | SEC    | UCM    |
| CONLIST | MCT    | MTOPND  | PARM   | RQCMTO  | SLO    | VARS   |
| CONS    | MTO    | MTOPNX  | PND    | RQCRFR  | SRV    | WISHES |
| CONSOLE | MTOCOS | MTOSRV  | RFR    | RQCSLO  | SSCT   | WSC    |
| COS     | MTOINX | MTOSRVA | RQC    | RQCSRV  | SSVT   |        |

When the snap is completed, the following message is displayed on the console:

---

```
CTO150I SNAP COMMAND WAS PERFORMED SNAPID=xxxx
```

---

where *xxxx* is the snap identifying number (SNAPID) that is displayed at the lower right of the screen after the snap is completed.

## Displaying Internal Resource Utilization Statistics

To obtain statistical information on internal resource utilization, issue the following operator command:

```
F CONTROLO,USAGESTATS[=type]
```

In this command, *type* designates the type of a specific internal resource.

Valid values for *type* in this command are RQC, PND, and WSC. When ALL is specified as a resource type, or when the parameter is omitted, information regarding all the above resource types is displayed.

The following is a typical sequence of messages displayed when this command is issued:

```
CTO356I USAGESTATS
```

```
CTO15EI RQC USAGE: CURRENTLY 1%, HIGHEST 1% (000001 AND 000019 OUT OF 010000)
```

```
CTO15EI PND USAGE: CURRENTLY 0%, HIGHEST 0% (000000 AND 000000 OUT OF 000011)
```

```
CTO15EI WSC USAGE: CURRENTLY 0%, HIGHEST 10% (000000 AND 000002 OUT OF 000020)
```

```
CTO357I COMMAND ENDED SUCCESSFULLY
```

For more information about these messages, see the *INCONTROL for z/OS Messages Manual*.

Control-O users can tune the PND and WSC by adjusting the values of the WAITPR# and WSCs# parameters in the CTOPARM member. However, the RQC cannot be tuned. Look for any PTFs that correct problems handling RQC.

## Displaying a Control-O Storage Table

To obtain information about Control-O usage of internal storage areas, issue operator command

---

```
F CONTROLO,STORAGETABLE
```

---

Only issue this command if requested by your BMC Customer Support representative.

Information message CTO356I is issued in response to this command. The figure shows an example of this message.

**Figure 69 Information Message CT0356I Example**

| CT0356I STORAGETABLE |          |          |          |          |        |        |
|----------------------|----------|----------|----------|----------|--------|--------|
| NAME                 | ADDRESS  | LEN(HEX) | LEN(DEC) |          |        |        |
| DEST                 | 00D495C8 | 00000108 | 00000264 |          |        |        |
| FMI X                | 00000000 | 00000000 | 00000000 |          |        |        |
| INX                  | 0370A390 | 000000E8 | 00000232 |          |        |        |
| MI X                 | 036C0D28 | 00000504 | 00001284 |          |        |        |
| MSGB                 | 00045190 | 00018E70 | 00102000 |          |        |        |
| PND                  | 0358BAC8 | 00021534 | 00136500 |          |        |        |
| SRVR                 | 03673EB8 | 00001144 | 00004420 |          |        |        |
| WSC                  | 03614000 | 0001E000 | 00122880 |          |        |        |
| NETMAP               | 00C014A0 | 00003B60 | 00015200 |          |        |        |
| CTOWTO               | 831B3600 | 0002AA10 | 00174608 | 12/21/00 | 16. 56 | B00709 |
| CTOAIDT              | 00BA6D58 | 000082B8 | 00033464 | 12/06/00 | 12. 18 | W00818 |
| CTOALT               | 80B8FEC0 | 00003140 | 00012608 | 11/16/00 | 12. 37 |        |
| CTOMTO               | 00006FB0 | 0003E050 | 00254032 | 01/09/01 | 13. 15 |        |

For more information about these messages, see the *INCONTROL for z/OS Messages Manual*.

Control-O users can tune the PND and WSC by adjusting the values of the WAITPR# and WSCs# parameters in the CTOPARM member. However, the RQC cannot be tuned. Look for any PTFs that correct problems handling RQC.

## Displaying Major Control-O Blocks

To display information about major blocks used by Control-O, issue operator command

```
F  CONTROLO,SHOWPARM
```

Only issue this command if requested by your local BMC Customer Support.

Information messages similar to the following are issued in response to this command:

```
CT0000I CTOPARM :CTOPARM - 11/22/00 18.32 - Control-O, REL 6.1.00
CT0000I IOAPARM :IOAP 11/23/00 17.03 6.1.00
CT0000I CTMPARM :CTMP 11/23/00 17.03 6.1.00
CT0000I CTOPARM AT 000414F8
CT0000I ****. . . . . CTOPARM - 11/22/00 18.32 - Control-O, REL 6.1.00
CT0000I FLAGS. . . . . CTM          CTOQNAME. . . 051TROLO    INTERVAL. . . 0000040
CT0000I DAYTIME. . . +1200        STSFL. . . . . 0
```

The first messages issued indicate the compilation date and level of existing CTOPARM, IOAPARM and CTMPARM blocks.

Additional information (for example, the address of blocks in ECSA storage) is supplied in subsequent messages.

## Changing Control-O's Operating Mode

A special Control-O operator command can be used to modify the operating mode of Control-O. Under normal circumstances, Control-O operating mode must not be modified. However, if severe Control-O problems are detected and BMC Customer Support representative has requested debugging information, these commands can help isolate and solve the problem.

Use the following operator command to modify the Control-O operating mode:

```
F CONTROL O,MODE [=modename]
```

where *modename* is the mode in which Control-O must be run. The following modes can be specified:

**Table 198 Control-O Operating Modes**

| Mode                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| blank                    | Displays the current operating mode of Control-O. Under normal circumstances, the following message is issued in response to this command:<br>CTO138I Control-O OPERATING MODE IS NORMAL                                                                                                                                                                                                                                                                                 |
| FREEZE                   | Freezes all Control-O automatic processes. No rules are activated and rules that are currently running (for example, they are paused due to a DO WAIT statement) are frozen. In FREEZE mode, messages and commands are not analyzed by Control-O and the Automation Log (Screen OL) does not display any new messages or commands.                                                                                                                                       |
| LOGONLY                  | Stops all Control-O automatic processes. No rules are activated and rules that are currently running (for example, they are paused due to a DO WAIT statement) are frozen. In LOGONLY mode, no messages or commands are analyzed by Control-O. However, the Automation log (Screen OL) displays all new messages and commands.                                                                                                                                           |
| TRIGGERONLY              | Stops all Control-O automatic processes. No rules are activated and rules that are currently running (for example, they are paused due to a DO WAIT statement) are frozen. However, Control-O examines rules to determine if they must be activated.<br><br>In TRIGGERONLY mode, the Automation log (Screen OL) displays all new messages and commands and indicates what actions (that is, rules) would have been performed if Control-O were operating in NORMAL mode. |
| RESUME,<br><i>option</i> | Returns Control-O to NORMAL mode. All automatic processes are resumed. The option appended to this command determines whether to continue rules that were running when the automatic processes were interrupted.<br>Valid <i>options</i> : <ul style="list-style-type: none"> <li>CONTINUE - Continue running interrupted rules.</li> <li>CANCEL - Abort interrupted rules.</li> </ul>                                                                                   |

The longer Control-O automatic processes are halted (due to a MODE command), the more likely Control-O's examination of messages and commands will result in unexpected actions. Therefore, it is recommended that you stop Control-O (using command P CONTROL O) and start Control-O (using command S CONTROL O) as soon as a debugging session is complete.

## Reacting to Events in a Sysplex Environment

### Messages in a SYSPLEX Environment

Depending on the system configuration of a SYSPLEX environment, a message may be sent to another system. The SYSPLEX definition requires that at least one active console that is eligible to receive the message will be on the receiving system. This is done in order to reduce the overhead of distributing the message to too many systems unnecessarily.

Messages from another system are not logged in the system SYSLOG. They are logged on the SYSLOG of the original system and on the OPERLOG, if in use.

Control-O calls a message from another system a REISSUED message. The IBM term for such a message is a reissued or foreign message.

Control-O rules can be triggered for a reissued message only if the SYSTEM field in the ON MESSAGE, ON STRING, ON JOBARRIV, and ON JOBEND statements are set.

If the SYSTEM field is not set, the current system is assumed and therefore only messages from the current system will trigger the rule.

Control-O logs reissued messages in the Automation Log only if a rule is triggered for the reissued message.

In order to identify a reissued message, the following fields in the Automation Log should be set:

- SYSTEM = Original system name.
- SMFID = Current system SMFID. Control-O does not know the SMFID of the original system.
- J3FLG = R. The reissued or foreign message flag is on.

### Commands in a SYSPLEX Environment

A command in a SYSPLEX environment is not sent automatically to another member of the SYSPLEX. To send the command to another system, the user who entered the command must use the ROUTE command or system affinity character before the command.

- Control-O on the original system controls the route command or the command with the affinity character.
- Control-O on the receiving system receives the route command or the command with the affinity character

For example:

```
ROUTE SYSA,D T
```

The Control-O rule on the original system should be:

```
ON COMMAND ROUTE SYSA, *
```

The Control-O rule on system SYSA should be:

```
ON COMMAND DISPLAY T
```

The Control-O that receives the command has no indication that the command was originally issued from another system.

## Other Control-O events in a SYSPLEX Environment

Other Control-O events like DSNEVENT, STEP, SYSOUT or MVALARM causes when the executing JOB or STC issues the event. That event can be triggered only by Control-O on the system where the job or STCs are executing.

In addition, Control-O roles that are triggered to messages from CICS, IMS and SYSOUTs are triggered on the system where the event occurred.

## Customization of Automation Options

Automation Options (AOP) screens can be modified and new screens defined to meet site requirements. For a description of the Automation Options facility, see the introduction and online facilities chapters in the *Control-O User Guide*.

### AOP Overview

The Automation Options facility is comprised of the following components:

- Menu Definition Members

Each menu definition is written in a member containing parameters (keywords and values) that describe the options in the menu. The following are defined for each option:

- the name of the option
- parameters that define the format of the display line
- the name of the program to be executed or, for a submenu, name of the member containing the submenu definition

Each Automation Option must have a menu definition member in the IOA MSG library. The name of this member must be the name of the menu, prefixed by ##. For example, the definition for menu OPER must reside in member ##OPER.

- The main Automation Options menu is defined in member ##AOP.
- To update or add an Automation Option, it is necessary to access the appropriate menu definition member and modify it.

- Format Members

Formats describe how lines provided by a client program are to be displayed on the screen. The format of the primary Automation Options screen provided by Control-O is specified in member \$\$AOP in the IOA MSG library. The user can write new formats and save them as members in the MSG library.

To avoid problems in the execution of the Automated Options facility, do not modify member \$\$AOP.

- Client programs

Client programs can be any independent load module, TSO CLIST, or REXX EXEC, which the Automation Options facility invokes either to perform functions or to provide lines to be displayed.



## Menus

Update the appropriate member in the IOA MSG library with the parameters of the new options. Each parameter described in this section defines a line in the specification of the new Automation Option.

### Menu Member Syntax

The following syntax rules must be considered when defining menus of new options:

- A menu statement consists of one or more lines, each with of a maximum of 72 columns.
- Each menu statement is comprised of a parameter (keyword and its value), separated by one or several blank spaces. Parameters can be specified in uppercase or lowercase.
- Data can be specified anywhere between columns 1 and 71.
- A non-blank character in column 72 indicates that the statement is continued on the next line.
- Data on continuation lines must start at column 16.

An asterisk (\*) in column 1 specifies that the line is a comment.

### AOP Parameters

**Table 199 Mandatory Parameters**

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OPTION    | <p>Name of the option (from one to eight characters) as it is displayed in the menu screen, or NULL if it is a submenu member. OPTION must be unique within the menu member. Mandatory.</p> <p>The OPTION parameter heads a group of statements. The group ends when a new OPTION parameter or the end of file is encountered.</p> <p>Example: OPTION USERINFO</p> <p>The OPTION statement can include subparameters to define special option attributes. Optional subparameters are:</p> <p>PAD – Default. When specified, the length of local AutoEdit variable <math>P_n</math>, based on a PROMPT line, calculated according to following rules:</p> <ul style="list-style-type: none"> <li>▪ for all PROMPT lines, except the last one, it is assumed to be the length of corresponding PROMPT line, regardless of the entered string;</li> <li>▪ for the last PROMPT line, it is the actual length of the entered variable.</li> </ul> <p>NOPAD – Actual length of the entered string will be calculated for every PROMPT line in the current group of statements.</p> <p>Example:     OPTION USERINFO NOPAD</p> |

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DESC      | <p>Description of the option as it is displayed in the menu screen, or NULL if it is a submenu member. DESC is a string of 1 to 70 characters, enclosed in single quotes. Mandatory.</p> <p>Example: DESC 'Query USER database'</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| LINECMD   | <p>Line command character. This character defines the line command used to select the option to be executed from the Automation Options entry panel.</p> <p>The line command character can be any character (with the exception of ?) that does not invoke the client program. When selected, ? displays the prompt window.</p> <p>LINECMD heads a subgroup of statements that define actions to be performed when the specified line command is entered. The subgroup ends when a new LINECMD, new OPTION, or end of file is encountered.</p> <p>At least one LINECMD must be specified within an OPTION group of statements. The following parameters help define the LINECMD subgroup: PROGRAM, PROMPT, PARM, RETURNS, FORMAT, OPTLIST. They are described in this table and in the following table.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| PROGRAM   | <p>Program name (from one to eight characters). Mandatory within a subgroup of statements headed by a LINECMD statement. PROGRAM names a client program that is invoked when the preceding line command LINECMD is entered. The program can be any regular load module, a TSO CLIST, or a REXX EXEC. The PROGRAM statement can include subparameters to define special program attributes. When no subparameters are specified, the client program performs according to Automation Options standard linkage conventions (described in member DOCOAOC in the IOA DOC library) and is called an AOP program.</p> <p>Subparameters of PROGRAM are:</p> <ul style="list-style-type: none"> <li>▪ IMMEDIATE – Prompt window is not displayed. If parameters are specified, they are passed directly to the program.</li> <li>▪ NOSCREEN – Display lines are not returned. (The client program may perform its own terminal I/O without using the Automation Options facility.) Programs specifying NOSCREEN can be invoked only under TSO.</li> <li>▪ ISPFENV – Valid ISPF environment is required. Programs specifying ISPFENV can be invoked only under ISPF.</li> <li>▪ TSOCP – Client program is invoked as a TSO command processor.</li> <li>▪ EXECPGM – Parameters are passed to the program in the format of the PARM statement of a JCL EXEC program.</li> <li>▪ REFRKEY – Definition of function keys for REFRESH action. Valid values: ENTER and PF04/PF16. Default: PF04/PF16.</li> </ul> |

**Table 200 Optional Parameters**

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SUBMENU   | Name of another MENU member used by the program. For details, see <a href="#">SubMenu Examples</a> (on page 597).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| PROMPT    | <p>Request for data to be passed to the client program. Optional. A maximum of 14 PROMPT statements can be specified.</p> <p>Each prompt entered by the user creates a local AutoEdit variable named <i>Pn</i> (where <i>n</i> is a number from 1 to 14).</p> <p>When the LINECMD character is specified and at least one PROMPT parameter has been specified, a prompt window is opened with as many prompt lines as PROMPT parameters in the menu. The user fills in the required input and presses <b>Enter</b>, thus calling the client program. The answers to the prompts are passed to the client program as an array unless the PARM parameter (see entry in this table) is specified. For a description of the format, see <a href="#">PROMPT Format</a> (on page 598) and <a href="#">PROMPT Examples</a> (on page 598).</p>                                                                                                                             |
| SET       | <p>String delimited by two identical characters (for example, both SET /xxx/ and SET 'xxx' are valid; SET /xxx' is invalid since the delimiters of the string are not identical).</p> <p>Optional. A maximum of 10 SET statements can be specified.</p> <p>This parameter assigns a value to a local AutoEdit variable (or performs AutoEdit functions). Similar to the SET subparameter in the DO SET statement.</p> <p>Local variables exist only for the current execution of the OA option.</p> <p>You can modify the parameters entered using the PROMPT statement.</p> <p>New local variables can be created for use in the PARM statement.</p> <p><b>Example</b></p> <pre>PROMPT      '      COMMAND          ===&gt;' , 4 PROMPT      '                      ===&gt;' , 3 SET          '%%A1=%%\$SUBSTR %%P1 1 3 ' SET          '%%A2=%%\$SUBSTR %%\$TIME 1 3 ' SET          '%%A3=%%\$DATE ' PARM '%%P1.%%P2.%%A1%%.%%\$BLANK.%%A2.%%\$BLANK.%%A3 '</pre> |

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PARM      | <p>String delimited by two identical characters (for example, both PARM /xxx/ and PARM 'xxx' are valid; PARM /xxx' is invalid since the delimiters of the string are not identical).</p> <p>The string contains input parameters that are required by the client program. Data between the delimiters can consist of any characters, except the character chosen as delimiter. The string can include special AutoEdit variables %%Pn and %%. , where</p> <p>%%Pn is the value assigned to PROMPT number n.</p> <p>%%. is a special variable used to concatenate two AutoEdit variables.</p> <p>For more information, see <a href="#">PARM Examples</a> (on page 598).</p>                                                                                                                                                                                                                                                                                                                                         |
| RETURNS   | <p>String, delimited by quotes (maximum 200 characters), that defines the layout of a line of display. Optional. Default is: 1 LINE +77. If display type A exists in the format member of the option, it must contain the name of all the variables defined here.</p> <p>The string is a simple Control-O template that names the format variables and their positions in the displayed line. Variable names must not exceed eight characters and their positions must be specified numerically only. (For detailed information on templates, see the %\$PARSE function in the AutoEdit chapter of the <i>Control-O User Guide</i>.)</p> <p>For each variable on the template, the following fields must be specified:</p> <p>starting position—starting position of the variable on the template string (character)</p> <p>variable name—name of the variable (in uppercase)</p> <p>length—length of the variable (in characters)</p> <p>For more details, see <a href="#">RETURNS Example</a> (on page 599).</p> |
| FORMAT    | <p>Name of the format member (from one to eight characters) used for displaying the lines returned from the client program. Format member name must begin with \$\$, in accordance with Automation Options conventions. Optional. FORMAT is ignored if specified in a menu together with subparameters NOSCREEN, TSOCP, or EXECPGM.</p> <p><b>Example</b></p> <p>FORMAT \$\$UINFO</p> <p>\$\$UINFO is the format member for use in displaying the return lines.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| OPTLIST   | <p>Name of a lower level menu member (from one to eight characters). Optional. To process a lower level menu, invoke the supplied program CTOTAMN and specify the \$\$AOP format member (or a similar format member) to display your customized Automation Options screen. OPTLIST must begin with ##, in accordance with Automation Options conventions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## SubMenu Examples

```
PROMPT      '      COMMAND      ===>' , 4
PROMPT      '                      ===>' , 3
SET          '%%A1=%%$SUBSTR %%P1 1 3 '
SET          '%%A2=%%$SUBSTR %%$TIME 1 3 '
SET          '%%A3=%%$DATE '
PARM        '%%P1.%%P2.%%A1%%.%%$BLANK.%%A2.%%$BLANK.%%A3 '
```

### Example 1

#### **PROGRAM AOPGUI NF**

Client program retrieves user information that is displayed later on the screen.

### Example 2

```
PROGRAM SDSF IMMEDIATE NOSCREEN TSOCP
```

TSO command processor does not receive any prompts and performs its own terminal I/O.

### Example 3

```
PROGRAM CLIST1 IMMEDIATE NOSCREEN TSOCP
```

TSO CLIST does not receive any prompts and performs its own terminal I/O.

### Example 4

#### **PROGRAM CTOTAMN**

#### **OPTLIST ##SAMPLE**

Invoke supplied program CTOTAMN to display the submenu defined in member ##SAMPLE.

### Example 5

```
PROGRAM CTOTPB1 SUBMENU(##PBOOK2)
```

The CTOTPB1 program uses ##PBOOK2 as a menu to the list it shows on the screen so another program or service can be invoked from the next menu level.

## PROMPT Format

```
PROMPT data1,length,data2
```

**Table 201 Fields for PROMPT**

| Field         | Description                                                                                                                                                             |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>data1</i>  | String of 1 to 20 characters between quotes. It is considered a comment, and can be used to describe the required input. Mandatory.                                     |
| <i>length</i> | Number (0 through 44) specifying the length of the prompt input field. Mandatory.                                                                                       |
| <i>data2</i>  | String in quotes specifying the prompt's initial value. Optional. If this field is specified, its length must be less than or equal to length. Default value is blanks. |

## PROMPT Examples

### Example 1

```
PROMPT 'User name ====>>',8
```

The user is prompted to enter an eight-byte input field. The field is initialized to blanks.

### Example 2

```
PROMPT 'Department ====>>',20,'TECH-SUPPORT'
```

The user is prompted to enter a 20-byte input field. The field is initialized to the value of 'TECH-SUPPORT' padded to the right with blanks.

## PARM Examples

Functions such as %\$SUBSTR can also be specified.

After AutoEdit symbols have been resolved, the string's length cannot exceed 255 characters.

### Example 1

```
PARM #00' '77#
```

Passes to the client program the value: 00' 77

### Example 2

```
PROMPT 'User name ====>', 8
```

```
PROMPT 'Department ====>', 20, 'TECH- SUPPORT'
```

```
PARM /QUERY, USERID=%%P1, DEPARTMENT=%%P2/
```

The first parameter is blank and the second parameter is TECH- SUPPORT.

If the user enters UserA on the first PROMPT line, leaves the second PROMPT line unchanged, and presses **Enter**, the following string is passed to the program:

```
QUERY, USERID=UserA, DEPARTMENT=TECH-SUPPORT
```

When both PROMPT and PARM statements are specified, their order within the menu is not important; however, the data is passed to the program as specified in the PARM statement.

## RETURNS Example

Divide the returned lines into the following displayable variables:

**Table 202 Variables that Can Be Displayed**

| Variable | Description                                          |
|----------|------------------------------------------------------|
| FIRSTNME | Begins in column 1 and its length is 8 characters.   |
| LASTNME  | Begins in column 20 and its length is 12 characters. |
| ADDRESS  | Begins in column 60 and its length is 35 characters. |

```
RETURNS '1 FIRSTNME +8 20 LASTNME +12 60 ADDRESS +35'
```

These variables must be defined in the corresponding format member.

RETURNS cannot be specified for programs specifying NOSCREEN.

## Example of Menu

```

OPTION USERINFO
DESC 'Query USER database'
LINECMD S
PROGRAM CTOTAMN
OPTLIST ##UINFO FORMAT $$AOP
RETURNS '1 OPTION +8 9 DESC +60'

```

When option USERINFO is selected by specifying S in the select option field of the Automation Options screen, the user-defined Automation Options specified in the ##UINFO menu member are displayed in a new screen.

## Format Members

Format members are used to format the lines displayed on the screen. For details on how to define and customize format members, see [IOA Administration](#) (on page 35).

The first @FIELD in each @LINE must be SAOPLCMD. The other @FIELDS in each @LINE must contain variables that match those in the RETURNS statement of the menu.

## Client Programs

A client program is a load module, TSO CLIST, or REXX EXEC that is invoked by the Automation Options facility when selected by a line command character (other than ?). Client programs can be called, with or without parameters, to perform a function and then return without displaying lines.

Sophisticated AOP programs receive parameters using PROMPTs or PARM statements, and return lines for display or as a submenu to have more selections or action windows. Before a program is called, the Automation Options facility reviews program attributes in the menu and takes special actions if necessary.

## Examples

If ISPFENV is specified, the Automation Options facility ensures that a valid ISPF environment exists before invoking the client program.

If IMMEDIATE is specified, the Automation Options facility checks the PROMPTs and the PARM specification in the menu, if any, and passes the data to the client program without displaying it on the screen.

General registers 1 through 15 contain the following information at the time of entry to the client program:



**Table 203      Information Stored in Registers 1 Through 15**

| Register | Description                       |
|----------|-----------------------------------|
| R15      | Entry point of the called program |
| R14      | Return address                    |
| R13      | Address of save area              |
| R1       | Address of input data             |
| R0       | N/A                               |
| R2–R12   | N/A                               |

## Program Input

The program input varies according to the type of client program: EXECPGM, TSOCP, or AOP or SUBMENU. A full description of the input data is included in member DOCOAOCP in the DOC library.

## Execution Process

Client programs of the TSOCP or EXECPGM type must follow these rules:

- Consider the program to be an extension of IOA. Because it runs under IOA, an abend of the client program triggers an abend of the IOA session. Storage overlays within the program may produce unpredictable results.
- Registers must be saved and restored according to standard IBM conventions.
- Areas acquired by the program during execution must be released before returning to the Automation Options facility. Failure to follow this rule may result in storage buildup and cause abends.
- CLISTs and REXX EXECs can be used under MVS/XA or higher level operating systems.
- Client programs that are not of type TSOCP or EXECPGM are called AOP programs. A full description of the execution process of an AOP program is included in member DOCOAOCP in the DOC library.

## Client Program Linkage Conventions

Client programs that do not specify attributes NOSCREEN, TSOCP, EXECPGM or SUBMENU, return a set of lines to the Automation Options facility. These lines are displayed according to the parameters specified in the format member referenced by the FORMAT statement in the menu definition member.

Client programs that specify attribute SUBMENU return a list of menu option lines to the Automation Options facility. These menu option lines are displayed according to the parameters specified in the OPTION member named by the SUBMENU keyword in the FORMAT member. You can specify line commands for each line of the submenu.

A full description of the Client Program Linkage Conventions for an AOP program is included in member DOCOAOC in the IOA DOC library.

An example of SUBMENU usage (using a phone book scenario) can be found in member CTOTPB\$ in the IOA SAMPLE library.

## Control-O and Control-M in the Same INCONTROL Environment

The following topics discuss issues to consider when both Control-O and Control-M are running in the same INCONTROL environment.

### After Installing Control-O and Control-M

When Control-O and Control-M are running together, the Control-O monitor assumes the responsibilities of both the CMEM facility and Control-O. The way in which the Control-O monitor functions depends on how organizational requirements, scheduling, and automation have been addressed at your site.

The following table describes the DD statements in the Control-O startup procedure that are relevant to this issue:

**Table 204 Relevant DD Statements in Control-O Startup Procedure**

| Statement | Description                                                                                                                                           |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| DARULLST  | References a member containing the list of Control-O rule tables to be loaded by the Control-O monitor. The default name for this member is RULELIST. |
| DACTMLST  | References a member containing the list of CMEM rule tables to be loaded by the Control-O monitor. The default name for this member is IOACMEML.      |

The Control-O monitor can operate in the following ways:

- If all automation was implemented using only the Online Control-O Rule Definition facility, and the CMEM facility was not used, start Control-O using operator command  

```
S CONTROL O
```

Control-O loads the rule tables listed in the member referenced by DD statement DARULLST. The member referenced by DD statement DACTMLST must be empty.
- If automation was implemented using both the Control-O Rule Definition facility and the CMEM facility, start Control-O using operator command  

```
S CONTROL O
```

Control-O first loads the CMEM rule tables listed in the member referenced by DD statement DACTMLST. Control-O then loads the Control-O rule tables listed in the member referenced by DD statement DARULLST.

- If automation was implemented using both the Control-O Rule Definition facility and the CMEM facility but, temporarily, only CMEM functionality is desired (for example, for a trial period), start Control-O using the following operator command:

```
S  CONTROLO,TYPE=CTOCMEM
```

This command causes the Control-O monitor to load only CMEM rule tables. Control-O loads the CMEM rule tables listed in the member referenced by DD statement DACTMLST. Loading of Control-O tables is skipped. Do not use this mode of operation on a long-term basis.

More information on the management of the CMEM facility by the Control-O monitor is provided at the beginning of this chapter.

## Accessing the Control-M API

If a Control-O rule queries the Control-M Active Jobs file (AJF) or the Control-M Resources file, it accesses them through the Control-M API (CTMAPI).

When maintenance of the AJF and Control-M Resources file is required, you can stop and restart Control-O allocation of the AJF and the Control-M Resources file through the CTMAPI, without having to stop Control-O. To do this, use the following commands:

**Table 205      Commands to Control Access of the CTMAPI**

| Command                 | Description                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| F  CONTROLO,CTMAPISTOP  | Stops Control-O usage of the CTMAPI, thereby deallocating the AJF and Control-M Resources file.                             |
| F  CONTROLO,CTMAPISTART | Enables the CTMAPI to allocate the AJF and/or Control-M Resources file the next time a Control-O rule requests information. |

The first time a rule requests information, the CTMAPI allocates the AJF and/or Control-M Resources file to Control-O, which remain allocated until specifically stopped with the F CONTROLO,CTMAPISTOP command.

For a description of the messages generated by these commands, see the *INCONTROL for z/OS Messages Manual*.

## Control-O/CICS Interface

Although regular Control-O processing can handle CICS messages that are sent to the MVS console, most CICS messages are not sent to the MVS console. CICS sends messages to an internal component called the Transient Data Queue and sometimes to the user console as well.

The Control-O/CICS interface enables you to retrieve these messages.

CICS commands are executed in a CICS transaction. There is no CICS exit that handles CICS system commands. Therefore, the Control-O CICS interface cannot handle CICS system commands.

## Control-O Interface for the CICS Environment

The Control-O/CICS interface uses the CICS XTDOU exit to intercept CICS messages that are to be sent to the Transient Data Queue. This exit receives control before each message is written to the Transient Data Queue and passes it to the Control-O/CICS interface module CTOCTDX. Module CTOCTDX passes the message to the Control-O WTO executor module (CTOWTO) as a WTO message. Module CTOWTO determines whether the message must be untouched, changed, or suppressed (that is, not written to the Transient Data Queue).

### Starting the Interface

The Control-O/CICS interface can be started in either of the following ways:

**Table 206 Methods for Starting Control-O/CICS**

| Method          | Description                                                                                                                               |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Manual start    | Issue the following CICS transaction:<br>IOAC INIT                                                                                        |
| Automatic start | Define the CTOCTDX program in the CICS DFHPLTPI table. This ensures that the Control-O/CICS interface is started when CICS is brought up. |

### IOAC Transaction Options

The table describes the options that can be specified for a CICS IOAC transaction.

**Table 207 Methods for Starting Control-O/CICS**

| Option         | Description                                                                                                                                                                                            |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INIT           | Start the Control-O/CICS interface.                                                                                                                                                                    |
| INIT, TRACE=ON | Start the Control-O/CICS interface. Issue trace messages describing the operation of the Control-O/CICS interface. Resulting messages are added to the CICS job log, and are displayed on the console. |
| SHUT           | Stop the Control-O/CICS interface.                                                                                                                                                                     |
| TRACE=ON       | Issue trace messages describing the operation of the Control-O/CICS interface. Resulting messages are added to the CICS job log, and are displayed on the console.                                     |
| TRACE=OFF      | Stop issuing trace messages describing the Control-O/CICS interface.                                                                                                                                   |

## Control-O/IMS Interface

Although regular Control-O processing can handle IMS messages that are sent to the MVS console, most IMS messages are not sent to the MVS console. IMS messages that are not sent to the MVS console are sent to an internal component called the Automated Operations Interface (AOI). The Control-O/IMS interface enables you to retrieve and respond to these messages.

Depending on the IMS version in use at your site, one of the following IMS AOI programs is used to handle messages:

**Table 208      IMS AOI Programs for Handling Messages**

| Program  | Description                                                                                                   |
|----------|---------------------------------------------------------------------------------------------------------------|
| DFSAOEU0 | This exit does not handle messages and commands in IMS DBCTL (the IMS address space in the CICS environment). |
| DFSAOE00 | This exit handles messages in all IMS address spaces.                                                         |

These programs are supplied with Control-O and are implemented during Control-O installation. These programs intercept IMS messages sent to the IMS Automation Interface and pass them to Control-O WTO executor module CTOWTO. The CTOWTO module determines whether the message must be untouched, changed, or suppressed.

## Operating the Control-O/IMS Interface

The Control-O/IMS interface is implemented using the Automated Operations Interface (AOI). AOI starts when the IMS environment is initiated, if either module DFSAOE00 is link-edited into the IMS nucleus or module DFSAOE00 is found in the IMS RESLIB library.

The AOI can be stopped in either of the following ways:

- Stop the IMS environment and delete module DFSAOE00 from the IMS RESLIB library.
- Stop the Control-O/IMS interface using a Control-O/IMS command.

## Control-O/IMS Commands

The Control-O/IMS interface is activated when IMS is brought up. The following table describes the commands that can be used with Control-O/IMS interface module DFSAOE00:

**Table 209**      **Commands for Use with Control-O/IMS Interface Module**

| Command         | Description                                                                                                                                                      |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| /DIS CTO STOP   | Stop the Control-O/IMS interface module DFSAOE00.                                                                                                                |
| /DIS CTO START  | Reactivate interface module DFSAOE00.                                                                                                                            |
| /DIS CTO CANCEL | Terminate interface module DFSAOE00. If the interface module is terminated using this command, it cannot be reactivated until IMS is brought down and restarted. |

Control-O/IMS commands are relevant only for IMS version 5 and later.

## Control-O MAINVIEW Alarm Interface

Control-O provides a special interface to support ON MVALARM events originating from the MAINVIEW Alarm environment. For a description of the ON MVALARM parameter, see the chapter that discusses rule parameters in the *Control-O User Guide*.

## Controlling MAINVIEW Alarm Support (ON MVALARM Rules)

The AutoOPERATOR interface is shared among all Control-O installations in a site, whether or not the Control-O version is 6.2 or later. The first Control-O subsystem to initialize among all Control-O installations loads the AutoOPERATOR interface module into common storage, which is later used by all other Control-O subsystems. Upon startup, each subsystem registers itself with the AutoOPERATOR interface. This registration mechanism enables the AutoOPERATOR interface to recognize all available Control-O subsystems and to call them when the AutoOPERATOR interface is driven.

When a Control-O subsystem shuts down, it removes itself from the MAINVIEW interface. The last Control-O subsystem to shut down completely removes the AutoOPERATOR interface from common storage.

## Control-O MAINVIEW Commands

Control-O enables the operator to start and stop the MAINVIEW interface using the Modify operator command. The following operator commands are available:

```
F CONTROL0 , STARTMVI
```

```
F , CONTROL0 , STOPMVI , FORCE
```

## Starting the MAINVIEW Interface

The STARTMVI command instructs a Control-O subsystem to restart the MAINVIEW interface. This includes a possible initialization of the interface, if it has not yet been initialized by another subsystem or registration of the current subsystem in the MAINVIEW interface. If the STARTMVI command is issued for a subsystem that is already registered with the MAINVIEW interface, the following message is displayed:

---

**CT0848I SUBSYSTEM ALREADY REGISTERED WITH MAINVIEW  
INTERFACE**

---

## Stopping the MAINVIEW Interface

The STOPMVI command instructs a Control-O subsystem to deactivate the MAINVIEW interface. This includes removing the registration of the current subsystem from the MAINVIEW interface, and possibly removing the MAINVIEW interface from common storage, if no other subsystems are using it. When issuing the STOPMVI command for a subsystem that is not registered with the MAINVIEW interface, the following message is displayed:

---

**MT084HW SUBSYSTEM NOT REMOVED FROM MAINVIEW  
INTERFACE: SUBSYSTEM NOT FOUND**

---

When issuing the STOPMVI command when no MAINVIEW interface is present, the following message is displayed:

---

**MT084GW MAINVIEW INTERFACE MODULE NOT INSTALLED**

---

## Forcing the MAINVIEW Interface to Stop

The STOPMVI, FORCE command instructs Control-O to remove the MAINVIEW interface from common storage, regardless of any registered subsystems.

Control-O also provides a procedure named CTOMVDSC that can be started from the console using the START command. This procedure acts like a STOPMVI, FORCE command, and removes the MAINVIEW interface regardless of any registered subsystems.

The STOPMVI, FORCE command and the CTOMVDSC procedure must be used only in case of emergency.

## Control-O MAINVIEW AutoOPERATOR interface

Control-O and CMEM provide a special interface to support MAINVIEW AutoOPERATOR version 5.1 and later, using the ON AOREQ rule to enable AutoOPERATOR to communicate with Control-M, Control-D, and IOA through Control-O rules.

The AOREQ rule is part of the AutoOPERATOR product.

For a description of the ON AOREQ parameter, see the chapter that discusses rule parameters in the *Control-O User Guide*.

## Controlling MAINVIEW AutoOPERATOR support (ON AOREQ rules)

### Controlling MAINVIEW Alarm Support (ON MVALARM Rules)

The AutoOPERATOR interface is shared among all Control-O installations in a site, whether or not the Control-O version is 6.2 or later. The first Control-O subsystem to initialize among all Control-O installations loads the AutoOPERATOR interface module into common storage, which is later used by all other Control-O subsystems. Upon startup, each subsystem registers itself with the AutoOPERATOR interface. This registration mechanism enables the AutoOPERATOR interface to recognize all available Control-O subsystems and to call them when the AutoOPERATOR interface is driven.

When a Control-O subsystem shuts down, it removes itself from the MAINVIEW interface. The last Control-O subsystem to shut down completely removes the AutoOPERATOR interface from common storage.

### Starting the AutoOPERATOR interface

The STARTAAO command instructs a Control-O subsystem to restart the AutoOPERATOR interface. This includes a possible initialization of the interface, if it was not yet initialized by another subsystem or by registration of the current subsystem in the AutoOPERATOR interface.

Either of the following message sequences indicates a successful installation of the AutoOPERATOR interface:

- for the first Control-O subsystem to initialize:

*CT083AI INITIALIZATION OF AUTOOPERATOR SUPPORT STARTED*

*CT083EI SUBSYSTEM REGISTERED WITH AUTOOPERATOR INTERFACE*

*CT083FI INITIALIZATION OF AUTOOPERATOR SUPPORT ENDED SUCCESSFULLY*

- for any subsequent Control-O subsystem that initializes:

*CT083EI SUBSYSTEM REGISTERED WITH AUTOOPERATOR INTERFACE*

*CT083FI INITIALIZATION OF AUTOOPERATOR SUPPORT ENDED SUCCESSFULLY*

### Stopping the AutoOPERATOR interface

The STOPAAO command instructs a Control-O subsystem to deactivate the AutoOPERATOR interface. This includes removing the registration of the current subsystem from the AutoOPERATOR interface, and possibly removing the AutoOPERATOR interface from common storage, if no other subsystems are using it.

Either one of the following message sequences indicates a successful deactivation of the MAINVIEW interface:



- For all but the last Control-O subsystem to shut down:

*CT083KI DEACTIVATION OF AUTOOPERATOR SUPPORT STARTED*

*CT083OI SUBSYSTEM REGISTRATION REMOVED FROM AUTOOPERATOR INTERFACE*

*CT083QI DEACTIVATION OF AUTOOPERATOR SUPPORT ENDED SUCCESSFULLY*

- for the last Control-O subsystem that shuts down:

*CT083OI SUBSYSTEM REGISTRATION REMOVED FROM AUTOOPERATOR INTERFACE*

*CT083QI DEACTIVATION OF AUTOOPERATOR SUPPORT ENDED SUCCESSFULLY*

## Forcing the AutoOPERATOR interface to stop

The *STOPAAO, FORCE* command instructs Control-O to remove the AutoOPERATOR interface from common storage, regardless of any registered subsystems.

Use the *STOPAAO, FORCE* command only in case of emergency.

## Control-O SMS Interface

Control-O provides a special interface to support ON SMS events originating from SMS ACS exit routines.

## Controlling SMS Support (ON SMS Rules)

The SMS interface is shared among all Control-O installations in the site and therefore is version-independent. The first Control-O subsystem to initialize loads the SMS interface module to common storage that is later used by all other Control-O subsystems. Every subsystem, upon startup, registers itself with the SMS interface. This registration mechanism allows the SMS interface to recognize all available Control-O subsystems and to call them when one of the provided ACS exit routines is driven.

When a Control-O subsystem shuts down, it removes itself from the SMS interface. The last Control-O subsystem to shut down also removes the SMS interface completely from common storage.

Either of the following message sequences indicates a successful installation of the SMS interface:

- for the first Control-O subsystem to initialize

**CT082OI INITIALIZATION OF SMS SUPPORT STARTED**

**CT0821I SMS INTERFACE MODULE SUCCESSFULLY LOADED**

**CT0822I SUBSYSTEM REGISTERED WITH SMS INTERFACE**

**CT0823I INITIALIZATION OF SMS SUPPORT ENDED**

**SUCCESSFULLY**

- for any subsequent Control-O subsystem that initializes

---

**CT0820I INITIALIZATION OF SMS SUPPORT STARTED**

**CT0822I SUBSYSTEM REGISTERED WITH SMS INTERFACE**

**CT0823I INITIALIZATION OF SMS SUPPORT ENDED**

**SUCCESSFULLY**

---

Either one of the following message sequences indicates a successful deactivation of the SMS interface:

- for any Control-O subsystem to shut down, except for the last in the system

---

**CT0830I DEACTIVATION OF SMS SUPPORT STARTED**

**CT0831I SUBSYSTEM REMOVED FROM SMS INTERFACE**

**CT0833I DEACTIVATION OF SMS SUPPORT ENDED**

**SUCCESSFULLY**

---

- for the last Control-O subsystem that shuts down

---

**CT0830I DEACTIVATION OF SMS SUPPORT STARTED**

**CT0831I SUBSYSTEM REMOVED FROM SMS INTERFACE**

**CT0832I SMS INTERFACE MODULE REMOVED**

**CT0833I DEACTIVATION OF SMS SUPPORT ENDED**

**SUCCESSFULLY**

---

## Control-O/SMS Commands

Control-O provides means for the operator to start and stop the SMS interface using the Modify operator command.

Usually, there is no need to intervene with the default processing taken by Control-O. The following operator commands are available:

---

**F CONTROL0, STARTSMS**

**F, CONTROL0, STOPSMS, FORCE**

---

The STARTSMS command instructs a Control-O subsystem to restart the SMS interface. This includes a possible initialization of the interface (if it has not yet been initialized by another subsystem), and/or registration of the current subsystem in the SMS interface. If the STARTSMS command is issued against a subsystem that is already registered with the SMS interface, the following message is issued:

---

## CT0828I SUBSYSTEM ALREADY REGISTERED WITH SMS INTERFACE

---

The STOPSMS command instructs a Control-O subsystem to deactivate the SMS interface. This includes unregistration of the current subsystem from the SMS interface, and a possible removal of the SMS interface from common storage, if no other subsystems use it. When issuing the STOPSMS command against a subsystem that is not registered with the SMS interface, the following message is issued:

---

## MT0836W SUBSYSTEM NOT REMOVED FROM SMS INTERFACE: SUBSYSTEM NOT FOUND

---

When issuing the STOPSMS command when no SMS interface is present, the following message is issued:

---

## MT0835W SMS INTERFACE MODULE NOT INSTALLED

---

The STOPSMS,FORCE command instructs Control-O to remove the SMS interface from common storage, regardless of any registered subsystems.

Control-O also provides a started procedure named CTOSMDSC that can be started from the console using the START command. The CTOSMDSC procedure acts like a STOPSMS,FORCE command, and removes the SMS interface regardless of any registered subsystems. The STOPSMS,FORCE command and the CTOSMDSC procedure must be used only in case of emergency.

## Starting Control-O Communication Support (IOAGATE)

Verify that the IOA Gateway has been successfully installed before trying to start IOAGATE. For information about installing the IOA Gateway, see the IOA chapter in the *INCONTROL for z/OS Installation Guide: Installing*.

Verify that Control-O table CTOGATEI is loaded from the Control-O Rules library. This rule table includes a set of rules that executes the remote request. It must be loaded for every Control-O monitor that communicates using IOAGATE, Sysplex or Control-O/COSMOS in a Sysplex.

1. To start IOAGATE processing, first initialize the mainframe components. Control-O users can then proceed to use the communication channel.
2. Activate the IOA Gateway using operator command:

---

```
S IOAGATE
```

---

ECAPARM communication parameters (APPLIDS, PORT) can be overridden by parameters specified in the EXEC PARM of IOAGATE. For information about ECAPARM parameters, see the IOA chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

For example

---

```
S IOAGATE,APPLID=CTOLUA1
```

---

The Control-O Application Server (called CTOAS) is automatically activated by the IOA Gateway.

3. To deactivate the IOA Gateway, use operator command

```
P IOAGATE
```

This also deactivates the Control-O Application Server (CTOAS).

## Displaying a List of All Active Users

To display the list of all active users in the Application Server, use operator command

```
F IOAGATE,MODASID[=nn],D[ISPLAY]
```

where *nn* is the specific address space ID of the server to which the modify command is submitted. If no address space is specified, the modify command is submitted to all active server address spaces.

When D [DISPLAY] is specified, a list of all active sessions are displayed.

## Considerations

When Control-O and IOAGATE are installed, the following modify commands are available:

These commands are available only if parameter CTOGATE is set to YES in member CTOPARM.

For a list of systems to which Control-O is connected to the IOAGATE and using Sysplex, issue the following command:

```
F CONTROLO,DISPCOMM
```

In the case of Sysplex, the first Sysplex name is also listed.

The following is displayed as a result of this command:

```
CT0356I DISPCOMM
```

```
Control - 0 COMMUNICATION MAP
```

```
VTAM CONNECTIONS:
```

| NAME  | LU      | APPL |
|-------|---------|------|
| CT001 | CT0LU01 | 0    |
| CT003 | CT0LU03 | 0    |

```
SYSPLEX CONNECTIONS:
```

```
ESA1
```

- To enable communication after the STOPCOMM modify command was issued, use the command  
F CONTROLO,STARTCOMM

This command is available only if parameter CTOGATE is set to YES in member CTOPARM and if communication was stopped.

- To disable communication in Control-O, use the command

```
F CONTROLO,STOPCOMM
```

This command is available only if parameter CTOGATE is set to YES in member CTOPARM and if communication was started.

- During problem determination, to snap the system network map, use the command

```
F CONTROLO,SNAP=SYS
```

## Problem Determination

To enable or disable debug messages, specify operator command

```
F CTOAS,DEBUG=(nn[, -nn]...)
```

where *nn* enables and *-nn* disables debug action *nn* in the following table:

**Table 210 Fields for Problem Determination**

| Action | Description                                             |
|--------|---------------------------------------------------------|
| nn     | Debug Action                                            |
| 10     | Write Sender module messages to DD statement DATRACE.   |
| 11     | Write Receiver module messages to DD statement DATRACE. |

# Control-M/Analyzer

## Overview

This chapter describes the initialization and customization features that are available for Control-M/Analyzer.

## Control-M/Analyzer New Day Procedure

The Control-M/Analyzer New Day procedure (CTBNDAY) performs certain automatic functions that start a new day under Control-M/Analyzer. It performs daily cleanup operations on the Control-M/Analyzer Active Balancing file and, optionally, other files. It also orders (activates) Control-M/Analyzer missions.

The name "CTBNDAY" is defined during the installation process and may be different at your site

The New Day procedure can be activated automatically by a scheduler (for example, Control-M) at a predefined time each day. It can also be activated manually by submitting a job or starting a started task (STC).

The supplied New Day procedure activates program CTMILY. Program CTMILY reads the sequential dataset (or member) referenced by DD statement DAPROG. This dataset contains a list of programs to be activated.

The following table details the normal sequence of programs and utilities activated by the New Day procedure:

**Table 211 New Day Procedure Programs and Utilities**

| Program | Purpose                                                                                                                                                                                                                                                                              |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTBCHK  | Checks the current date and its relation to the General Date Control record. For more information, see <a href="#">Date Control Record</a> (on page 615). The program may communicate with the computer operator to verify that Control-M/Analyzer is activated on the correct date. |
| CTBFRM  | Reformats the Active Balancing file. Unnecessary missions are erased and the file is compressed.                                                                                                                                                                                     |
| CTBBAO  | Places balancing missions in the Active Balancing file according to the date in the Date Control record and scheduling criteria.                                                                                                                                                     |
| CTBPDA  | Records the end of the daily run.                                                                                                                                                                                                                                                    |

The Control-M/Analyzer New Day procedure usually runs once a day on one or more balancing mission definitions. The New Day procedure places mission entries in the Active Balancing file. Missions are selected according to the working date specified to the New Day procedure.

## Reformatting the Active Balancing File – Utility CTBFRM

The New Day procedure activates the CTBFRM utility to clean up and reformat the Active Balancing file. Missions and rules that have already executed and ended OK, and missions whose MAXWAIT parameter has been exceeded, are erased from the file. Unscheduled rules are automatically assigned a MAXWAIT value of 0. After these mission entries are erased, the Active Balancing file is compressed.

If the CTBFRM utility abends, information is recovered automatically after startup using an automatically generated backup copy of the ABFBKP Active Balancing file. For more information, see the CTBFRM utility in the *INCONTROL for z/OS Utilities Guide*.

## Scheduling Balancing Missions

The second function performed by the New Day procedure is the determination of the missions that can potentially be activated on a specific date (that is, which missions are placed in the Active Balancing file).

The missions that are scheduled depend on the working date. For additional information, see [Date Control Record](#) (on page 615).

## Date Control Record

The New Day procedure is date-dependent. The last running date of the New Day procedure is stored in a special Date Control record. The Date Control record is referenced by the DACHK DD statement in the CTBNDAY procedure.

The New Day procedure calls the CTBCHK program to check the Date Control record. The Date Control record is analyzed by the New Day procedure to determine the current running date, the last running date, and possible error situations. Special situations, such as downtime due to hardware failure, must be handled. If necessary, the Date Control record can be manually updated by using a regular editor, for example the ISPF editor.

## Format of the Date Control Record

Each Date Control record has 80 characters and contains the following fields:

**Table 212      Format of the Date Control Record**

| Columns | Field  | Purpose                                                                                                                                                                                                                                              |
|---------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01–06   | date-1 | Current (or last) original scheduling date.                                                                                                                                                                                                          |
| 18–23   | date-2 | Current (or last) original scheduling date of balancing missions using parameters DATES, DAYS, DCAL, and/or WCAL.                                                                                                                                    |
| 25–30   | date-3 | Finish indicator for missions of type date-2.                                                                                                                                                                                                        |
| 43–48   | date-4 | Current (or last) original scheduling date of balancing missions using parameter WDAY.                                                                                                                                                               |
| 50–55   | date-5 | Finish indicator for missions of type date-4.                                                                                                                                                                                                        |
| 60–65   | date-6 | Last date the Active Balancing file was formatted by the CTBFRM program. This field prevents formatting the file twice on the same day. If there are any problems concerning the date, the program presents the operator with a series of questions. |
| 67–72   | date-7 | "Finish indicator" date of the Control-M/Analyzer New Day procedure.                                                                                                                                                                                 |

The format of the dates is determined by the date standard used at your site.

## Use of the Date Control Record by the New Day Procedure

The Date Control record controls New Day procedure workflow. The New Day procedure, in turn, updates the Date Control record during various stages of New Day processing.

The main steps of the New Day procedure are

1. Check the last running date of the New Day procedure (using the CTBCHK internal program).
  - The first date in the Date Control record (columns 1 through 6) is compared to the current working date (at the time of the run).
  - If the current working date is the same as the first date in the Date Control record, a message indicates that the New Day procedure has already run today and the condition code is set to 0004.
  - If the current working date is earlier than the first date of the Date Control record, the New Day procedure stops executing and notifies the user that an attempt was made to run a New Day procedure before its time.
  - If the current working date is later than the first date of the Date Control record (the normal situation), the first date of the Date Control record (columns 1 through 6) is updated to the current working date that is then used by all components of the New Day procedure as the current scheduling date.



- If the New Day procedure did not run for more than one day, a warning message is issued and the New Day procedure attempts to schedule balancing missions for all of the days that have passed since the last scheduling date (according to production parameters).

The program "asks" the operator a series of questions regarding the computer's current date. This ensures that an incorrect date was not inadvertently entered during IPL.

2. Placing balancing missions in the Active Balancing file according to the current scheduling date and the last running date (using internal program CTBBAO).
  - Program CTBBAO acts on a user-defined balancing mission table referenced by DD statement DABAL. The program checks whether each mission in the table must be scheduled on one or all the days that have passed since the last original scheduling date (date-3 or date-5) until the current working date (date-1). If a mission must be scheduled, it is placed in the Active Balancing file.
  - For example, if a computer did not operate from the 20th to the 23rd, a mission originally scheduled to run on the 20th did not run. Program CTBBAO determines whether the mission must be retroactively scheduled to run on the logical date of the 20th. For more information, see the RETRO parameter in the mission definition parameters chapter of the *Control-M/Analyzer User Guide*.
  - When the program finishes processing the mission definitions, the "finish indicator" dates (date-3 and date-5) are updated to the working date calculated by program CTBCHK (date-1).
  - Before program CTBBAO starts operating, it compares date-2 with date-3 and date-4 with date-5. If they are not equal it probably means that a previous run of program CTBBAO has abended. The user is notified and the program terminates. To correct the error, you must edit the Date Control record to the correct date values.

When manually modifying the Date Control record, verify that the same missions are not scheduled to run twice on the same day.

3. Recording the end of the Daily run (using program CTBPDA).

Program CTBPDA updates the "finish indicator" date (date-7) by setting it to the value of the current working date (date-1). This is used to indicate that the New Day procedure finished successfully.

4. BMC recommends that the CTBJAFDL utility be run as the last step of the New Day procedure. For more information about this utility, see the *INCONTROL for z/OS Utilities Guide*.

## Invoking Control-M/Analyzer (Runtime Environment)

Control-M/Analyzer rules are invoked by the Control-M/Analyzer Runtime environment. Therefore, the Runtime environment must be invoked in order to invoke a Control-M/Analyzer rule.

The table describes the methods you can use to invoke the Control-M/Analyzer Runtime environment.

**Table 213 Invoking the Control-M/Analyzer Runtime Environment**

| Method            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Direct call       | When the Control-M/Analyzer Runtime environment is invoked by a direct call, the name of the rule to be invoked by the Runtime environment is one of the parameters passed in the call. The direct call to the Runtime environment can come from an application program, a job step, or another INCONTROL product. A search for the specified rule name is performed in the libraries referenced by DD statement DABRULE. No scheduling criteria are specified. The same rule is always activated. |
| Balancing mission | A search is performed for the specified balancing mission name in the Active Balancing file. After locating the appropriate mission, the rule specified by the mission is activated. When Control-M/Analyzer is invoked using this method, scheduling criteria can be specified for date-dependent balancing activities. For example, the same mission can activate different rules according to the day of the week using different categories of the mission.                                    |

These methods of rule activation are discussed in the coming topics.

## Passing Arguments While Invoking Control-M/Analyzer

Arguments can be passed when directly invoking Control-M/Analyzer by using procedure CONTROLB. The arguments are specified in the EXEC statement of the job step

```
// EXEC CONTROLB,RULE=rule,GROUP=group,MISSION=mission,ARG=arglist
```

where

- *rule* is the name of the rule to be invoked.
- *group* is the group name of the rule to be invoked.
- *mission* is the mission name of the rule to be invoked.
- *arglist* contains the arguments, separated by commas, to be passed to the rule.

A maximum of 50 arguments can be parsed in the ARG specification.

The arguments specified in *arglist* are accessed through System variable RARG $nn$ , where  $nn$  is a one- or two-digit number that represents the position of the argument in *arglist*. To access the value of the first argument in the list, specify RARG01 within a rule. For more information, see [Invoking Control-M/Analyzer Using a Direct Call](#) (on page 619), and [Invoking Control-M/Analyzer Using Balancing Missions](#) (on page 622).

## Example

The following sample JCL and rule definition demonstrate how an argument can be passed when invoking Control-M/Analyzer. In this case, the value PROD1.COPY.FILE1 is passed to Control-M/Analyzer as an argument. In Control-M/Analyzer, this value is checked to indicate whether the dataset exists. The JCL continues to run according to the result of the Control-M/Analyzer activation.

```
//CHKTAPE      JOB          O, ACCT, CLASS=A, MSGCLASS=X, COND=(0, NE)
//CTB           EXEC        CONTROLB, RULE=RULDSN, ARG=' PROD1. COPY. FILE1'
//COPYTAPE     EXEC        PGM=IEBCOPY
//SYSPRINT     DD          SYSOUT=*
//IN            DD          DSN=PROD. COPY. FILE1, DISP=SHR
//OUT           DD          DISP=(NEW, PASS), DSN=COPY. FILE1,
//              VOL=SER=TAPE18, UNIT=TAPE,
//              LABEL=(1, SL)
//SYSIN         DD          *
C               0=OUT, I=IN
//
LIBRARY : CTB. PROD. RULES                                     RULE : RULDSN
COMMAND =====>   SCROLL====> CRSR
```

---

```
+-----+
OWNER    M42A                                GROUP PROD1
UPDATED  10/10/00 -   12: 19: 37             BY M42A
DESC
OPTIONS
```

---

```
=====
EXECUTE BLOCK1   UPON                                  C
ON DATA
IF              ISDSN(' %%RARGO1' )                  C
DO TERMINAT = OK                COD 0000
ELSE
DO PRINT       = FILE %%RARGO1 DOES NOT EXIST        F   C
DO TERMINAT = NOTOK             COD 0008
=====
EXECUTE                 UPON                           C
ON
```

---

```
===== >>>>>>>>>> END OF RULE DEFINITION PARAMETERS <<<<<<<<<<<<<< =====
```

## Invoking Control-M/Analyzer Using a Direct Call

The Control-M/Analyzer Runtime environment can be invoked by a direct call from any of the following:

- application program

The name of the rule to be invoked is specified by the application program's call to Control-M/Analyzer. For additional information, see the section about calling user routines in the *Control-M/Analyzer User Guide*.

The syntax is

CALL CONTROLB(<rule name>)

- job step

The rule to be invoked is specified by the JCL statement of the job step (in the balancing job). This is the most frequently used method.

The syntax is

```
// EXEC CONTROLB,RULE=rulename,GROUP=group,ARG=(arg1,...argn)
```

The GROUP argument is mandatory only if the rule definition does not contain a value for parameter GROUP. If parameter GROUP is specified in the rule definition, the GROUP argument is optional.

The ARG specification allows up to 50 arguments. For more information, see [Passing Arguments While Invoking Control-M/Analyzer](#) (on page 618).

- another INCONTROL product

The rule to be invoked is specified by parameter DO CTBRULE in a Control-M job scheduling definition or a Control-D decollating mission definition.

When Control-M/Analyzer starts processing, it searches for the specified rule in the libraries referenced by DD statement DABRULE.

If the rule is found, it is invoked. If the rule is not found, a runtime error occurs.

This flexibility allows the Control-M/Analyzer user to select one or more appropriate points in the life cycle of a particular data source during which balancing activities must be performed. For example:

- Control-M/Analyzer can be invoked before the creation of a report to check the validity of the report job input.
- Control-M/Analyzer can be invoked before updating a database (for example, a DB2 table) or an important file in the system. Control-M/Analyzer checks the validity of the input used for the update.
- After a report is created, it can be checked during the current job before executing other steps in the job and before the report is distributed.
- Control-D can invoke a Control-M/Analyzer rule to validate a decollation process.
- Control-M can invoke Control-M/Analyzer to perform balancing actions that verify the input and/or output of a job run. Job flow can be controlled by Control-M based on the results of these balancing actions.

## Invoking Control-M/Analyzer from a Job Step or Application Program

The following parameters can be used to invoke Control-M/Analyzer from a job step or from an application program:

- RULE
- MISSION
- GROUP
- ARG

Parameters RULE and MISSION cannot be specified together to invoke balancing operations (that is, the user must decide whether Control-M/Analyzer must be invoked directly or indirectly). Either the mission name or rule name must be specified, but not both.

The group name is determined as follows:

1. If GROUP is specified in the invocation, that group name overrides any other group specification.

2. If GROUP is not specified in the invocation and balancing operations are invoked by a mission, the group name of the mission is used.
3. Otherwise, the group name specified in the rule definition is used as the current group.

The specified group must already be defined in the Control-M/Analyzer repository.

Parameters can be passed to a Control-M/Analyzer rule and accessed by the rule through system variable RARG $nn$ , where  $nn$  is a one- or two-digit number that represents the position of the argument in the argument list. To access the value of the first argument in the list, specify RARG01 within a rule.

## Examples of Job Step Invocation

- Direct invocation of a Control-M/Analyzer rule  

```
// EXEC CONTROLB,RULE=ACCTCHK,GROUP=ACCT,ARG='12/06/00'
```
- Control-M/Analyzer invocation using a mission  

```
// EXEC CONTROLB,MISSION=ACTMISS
```
- Application program invocation  

```
CALL CONTROLB,(rulename,mission,groupname,result,argument-count,argument-list)
```

## Invoking Control-M/Analyzer from Control-M

When Control-M/Analyzer is invoked by Control-M, it is not necessary to specify scheduling criteria for the rule (that is, there is no need to define a balancing mission). The Control-M/Analyzer rule is scheduled in accordance with the scheduling criteria specified in the Control-M job scheduling definition.

However, when invoked by Control-M, Control-M/Analyzer must execute each rule for a specific group. The name of the group can be specified by any of the following methods, which are listed in order of decreasing priority. The group name can be specified in

- the GROUP parameter in the Control-M/Analyzer rule
- the GROUP parameter in the Control-M job scheduling mission
- the GROUP=*group\_name* argument in the procedure that invokes Control-M/Analyzer

If a group name is specified by more than one of these methods, the rule is implemented with the group name specified by the method with the highest priority.

## Invoking Control-M/Analyzer from Control-D

When Control-M/Analyzer is invoked by Control-D, it is not necessary to specify scheduling criteria for the rule (that is, there is no need to define a balancing mission). The Control-M/Analyzer rule is scheduled in accordance with the scheduling criteria specified in the Control-D decollating mission definition.

BMC recommends that a group be specified in the Control-M/Analyzer rule or in the Control-D decollating mission. When Control-M/Analyzer is invoked, the name of the group is obtained from one of the following sources, which are listed in order of decreasing priority. The group name can be specified in the GROUP parameter of the

- Control-M/Analyzer rule.
- Control-D decollating mission.

If a group name is specified in both of these parameters, the rule is implemented with the group name specified in Control-D.

## Invoking Control-M/Analyzer Using Balancing Missions

Balancing missions can be used to invoke Control-M/Analyzer from one of the following:

- application program

Name of the mission to invoke is specified by a program call to Control-M/Analyzer in the application program. For additional information, see the section about calling user routines in the *Control-M/Analyzer User Guide*.

### Example

```
CALL CONTROLB(<mission>, ...);
```

- job step

Name of the mission to be invoked is specified in the JCL statements of the job step that invokes the Control-M/Analyzer Runtime environment.

### Example

```
// EXEC    CONTROLB,
//        MISSION=DAILYBAL, GROUP=group, ARG=(arg1, ..., argn)
```

The GROUP argument is mandatory only if the rule definition does not contain a value for the GROUP parameter. If the GROUP parameter is specified in the rule definition, the GROUP argument is optional.

The ARG specification allows up to 50 arguments. For more information see [Passing Arguments While Invoking Control-M/Analyzer](#) (on page 618).

When the call or step that invokes Control-M/Analyzer is invoked, Control-M/Analyzer first checks each entry in the Active Balancing file to locate the appropriate balancing mission. the following table describes the phases of the Active Balancing file search method.

**Table 214 Active Balancing File Search Method Phases**

| Phase   | Description                                                                                                                                                                                                                |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phase 1 | All mission entries with corresponding mission names are checked to see if their runtime scheduling criteria are met. Missions whose runtime scheduling criteria are met advance to the second phase for further checking. |
| Phase 2 | Missions that have passed the first phase are checked to see if the values specified by parameters JOB and STEP match the job name and (optional) step name of the current call or step.                                   |

The \* mask character can be specified at the end of JOB and STEP names.

The SCOPE parameter of each eligible mission entry in the Active Balancing file is checked to determine a JOB-STEP match. The SCOPE parameter specifies one of the following options:

**Table 215 Values for Parameter SCOPE**

| Option | Description                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SINGLE | If JOB and STEP values match, the mission entry is eligible for further checking only if it has not been invoked before. the SINGLE option guarantees that this mission entry is only invoked once – by a single Control-M/Analyzer invocation.                                                                                                                                                                                           |
| STEP   | If JOB and STEP values match, the mission entry is eligible for further checking if it has not been invoked before or if it was previously invoked by the current STEP in the current JOB. The STEP option enables the mission entry to be invoked repeatedly, provided that the mission entry is invoked from the same job step each time (for example, from an application program that invokes Control-M/Analyzer from within a loop). |
| JOB    | If the JOB value matches, the mission entry is eligible for further checking if it has not been invoked before or if it was previously invoked by the current JOB. The JOB option enables the mission entry to be invoked by several Control-M/Analyzer invocations, provided that the invocations all originated from the same job.                                                                                                      |
| ALL    | The mission entry is always eligible for further checking. The ALL option enables the mission entry to be invoked regardless of the JOB and STEP that previously invoked the mission entry.                                                                                                                                                                                                                                               |

The first mission that matches the above criteria is selected for execution. If no matching mission is found, a runtime error occurs.

## Control-M/Restart Support for the Control-M/Analyzer Rollback Facility

### Rollback Activation using Control-M/Restart

The Control-M/Analyzer Rollback feature can be activated by Control-M/Restart. When Control-M/Restart restarts a job run by Control-M, the Rollback feature is automatically invoked if Control-M/Restart User Exit CTRX001Q is installed.

### Control-M/Restart Implementation

Perform the following steps to use the Control-M/Restart to Control-M/Analyzer Interface:

1. Install [Exits](#) (on page 745) Control-M/Restart User Exit CTRX001Q. For more information, see Exits.
2. Follow the instructions in the following section.

### Triggering Rollback using Procedure CONTROLR

Each job run by Control-M has a unique five-character alphanumeric order ID. This order ID is displayed (as OrderID=xxxxx) in the Control-M Active Environment screen (Screen 3) when command ORDERID is entered on the command line.

Perform the following steps to implement the automatic Rollback facility for jobs restarted by Control-M/Restart:

1. Pass the Control-M order ID to the Control-M/Analyzer rule that generates the variables that are stored in the Control-M/Analyzer database.

You can do this by passing AutoEdit variable `%%ORDERID` as an argument in the EXEC statement that invokes Control-M/Analyzer. The EXEC statement syntax is

```
// EXEC CONTROLB ,RULE=MYRULE ,ARG=%%ORDERID
```

For example, if 014OX is the order ID of the Control-M job that invokes Control-M/Analyzer, the EXEC statement that invokes Control-M/Analyzer resolves to

```
// EXEC CONTROLB ,RULE=MYRULE ,ARG=014OX
```

2. In the Control-M/Analyzer rule, define a DO REMARK statement that inserts the order ID value in the Control-M/Analyzer activity record.

When the order ID value is passed to Control-M/Analyzer, the rule must execute the following statement:

```
DO REMARK DATA 'OID=%%RARGnn'
```

where `%%RARGnn` refers to the nth argument passed to the rule.



For example, use `%%RARG01` if `%%ORDERID` is the first argument. After statement `DO REMARK` is executed, the activity record for this Control-M/Analyzer execution contains the value: `OID=0140X`. This value can be displayed in the `REMARK` field of the Control-M/Analyzer Rule Activity screen (Screen BA).

3. The Control-M/Analyzer activity record automatically identifies the generation of database variables that was created by the job that is being restarted by Control-M/Restart.
4. Call User Exit `CTRX001Q` with the order ID of the job that created the variables that must be rolled back.

This requirement is automatically satisfied when Control-M/Restart calls User Exit `CTRX001Q` with the current order ID. This user exit passes the order ID to the Rollback facility. The Rollback facility rolls back database records created during execution of the job whose activity record contains this order ID.

## Sample Control-M/Analyzer Rule

The following sample rule illustrates how to use the `DO REMARK` statement to insert the order ID in the `REMARK` field of the Control-M/Analyzer activity record:

**Figure 73 Sample Control-M/Analyzer Rule**

|              |                       |            |
|--------------|-----------------------|------------|
| OWNER        | N52                   | GROUP TEST |
| UPDATED      | 10/10/00 - 17: 29: 17 | BY N52B    |
| DESC         |                       |            |
| OPTIONS      |                       |            |
| =====        |                       |            |
| EXECUTE INIT | UPON                  | C          |
| ON DATA      |                       |            |
| ALWAYS       |                       |            |
| DO REMARK    | = OID=%%RARG01        |            |
| =====        |                       |            |

# Control-M/Tape

## Overview

This chapter describes how the different components and files of Control-M/Tape are activated, controlled, and maintained on a regular daily basis. The following topics are discussed in this chapter:

- Control-M/Tape real-time environment
- new day procedure
- repository structure
- repository maintenance
- repository backup and recovery
- media database view customization
- Control-M/Tape application programming interface (API)

Some administrative tasks are performed using Control-M/Tape utilities. For a detailed description of the available utilities, see the *INCONTROL for z/OS Utilities Guide*.

Additional customization and security measures can be implemented using Control-M/Tape exits. For a description of the available Control-M/Tape exits, see [Exits](#) (on page 745).

The following topics are described in the *Control-M/Tape Implementation Guide*: Interfaces for automated tape libraries, DFSMS, and EDMs, as well as detailed information about dataset stacking implementation.

## Control-M/Tape Real-Time Environment

The Real-Time environment of Control-M/Tape is established during the Initialization process.

Once the Real-Time environment is established, Control-M/Tape takes control of tape volumes processed in the system. This is accomplished by the Control-M/Tape MVS Tape Label Processing Exits. Control-M/Tape performs extensive validity checks to ensure the data integrity of the media library at the site. In addition, stacking can be performed for non-specific mount requests. As a dataset moves through the system, Control-M/Tape gathers relevant information, searches rules to determine the required actions (such as retention and vaulting information), and updates the Media Database.

The following sections describe these topics.

## Initialization

The first step in using Control-M/Tape is to initialize Control-M/Tape in each system. This is done by the CTTINIT procedure. Control-M/Tape is usually initialized as part of the IPL process. The following table lists and describes the steps that the CTTINIT procedure performs to establish the Control-M/Tape Real-Time environment:

**Table 216 CTTINIT initialization steps**

| CTTINIT Step | Description                                                                                                                                                                                                                                                                  |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 001          | Issues the CTT809I information message to indicate that Control-M/Tape initialization is started                                                                                                                                                                             |
| 002          | Creates the main Control-M/Tape Control Table (TCT).                                                                                                                                                                                                                         |
| 003          | Uses the TSSALLOC parameter values to dynamically create the Control-M/Tape sub-system.                                                                                                                                                                                      |
| 004          | Uses the DYN SVC parameter values to dynamically define the Control-M/Tape SVC number, which is specified as the SVCNUM installation parameter                                                                                                                               |
| 005          | Uses the DYNWTO parameter values to establish the WTO (Write to Operator) Intercept so that mount messages can be modified                                                                                                                                                   |
| 006          | Establishes the VOLSTAT Intercept so that I/O statistics will be gathered into the Media database.                                                                                                                                                                           |
| 007          | Dynamically installs the Fast-Positioning hook into MVS module that resides in the LPA<br>This hook remains until a termination process is run.                                                                                                                              |
| 008          | Uses the DYNINTR parameter settings to dynamically install the MVS Tape Label Processing Exits<br>These exits remain until a termination process is run.                                                                                                                     |
| 009          | Opens the following Control-M/Tape files, which are necessary for the Real-Time environment, and creates DCB for each file in the Common Storage Area (CSA): <ul style="list-style-type: none"> <li>Media Database</li> <li>Trace file</li> <li>Stacking Database</li> </ul> |
| 010          | Loads Control-M/Tape modules that are required by the real time environment into the Common Storage Area (CSA)                                                                                                                                                               |

| CTTINIT Step | Description                                                                                                                         |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 011          | Uses the STKALCD installation parameter settings to dynamically install the MVS IEFDB401 exit                                       |
| 012          | Creates the ASID block in the Common Storage Area (CSA). This block is internally used by the Control-M/Tape real time environment. |
| 013          | Loads Control-M/Tape rules, pool definitions, view definitions, and vault definitions into Common Storage Area (CSA)                |
| 014          | Indicates, in the main Control-M/Tape Control Table (TCT), if Dynamic Stacking is required                                          |
| 015          | Initializes the Control-M/Tape sub-system                                                                                           |
| 016          | Indicates, in the main Control-M/Tape Control Table (TCT), that Control-M/Tape is active                                            |

The STEPLIB DD statement must not be removed from the CTTINIT procedure. The CTTINIT procedure does not function properly if this DD statement is removed.

The Control-M/Tape Control Table (TCT) is a block of information that contains key control data and pointers, and resides in the Common Storage Area (CSA). Its address is used by all real-time components, such as the Control-M/Tape SVC and the sub-system, and certain other components, such as EDM expiration exits. All activity starts from the TCT, which contains pointers to all Control-M/Tape tables and modules in storage. The TCT, along with its related routines, remains in common storage until Control-M/Tape is shut down.

Upon completion of the initialization process, the Control-M/Tape Real-Time environment is established and Control-M/Tape takes control of removable media processing. After initialization, no address space is needed for the Control-M/Tape environment, with the exception of the IOA Functional monitor (IOAFMON), if you need automated tape library support or if you need to perform IOA functions such as sending and receiving Shout messages. For more information about the IOA Functional monitor, see [IOA Concepts and Components](#) (on page 17).

## CTTINIT Procedure

The CTTINIT procedure controls the initialization, termination, and operation of Control-M/Tape. This procedure is invoked by operator command

```
S CTTINIT, PARM= 'MODE=xxxxx[ , =nnn , =xxxxxxxxx ] '
```

The PARM field can contain one of the MODE= *values* described in the following topics.

The MODE keyword can be omitted. For example, PARM='MODE=INIT' and PARM=INIT are equivalent.

## Parameters Relating to Initialization, Termination and Refreshing

**Table 217 Parameters Relating to Initialization, Termination and Refreshing**

| Parameter                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MODE=INIT                         | Initializes Control-M/Tape. For details on how Control-M/Tape is initialized, see the organization and administration chapter in the <i>Control-M/Tape User Guide</i> . This command must be issued on each operating system in which Control-M/Tape is to be activated.                                                                                                                                                                                                                                       |
| MODE=TERM                         | Terminates Control-M/Tape. This command must be issued on each operating system in which Control-M/Tape was activated.                                                                                                                                                                                                                                                                                                                                                                                         |
| MODE=RELOAD,<br>EXIT= <i>exit</i> | <p>Loads a new copy of a Control-M/Tape exit without the need to restart Control-M/Tape. Specify the full name of the exit module, for example, CTTX004.</p> <p>Reloadable exits are: CTTX002, CTTX003, CTTSE03, CTTX004, CTTSE04, CTTX005, CTTX006, CTTSE06, CTTX009, CTTSE09, CTTX010 and IOAX035.</p>                                                                                                                                                                                                       |
| MODE=RELOAD,<br>TBLT=RULE         | <p>When Control-M/Tape is initialized, it reads a list of rule tables from the member referenced by the DARULLST DD statement in the CTTINIT procedure. The supplied default RULLIST member is in the Control-M/Tape PARM library. For every line in the list, Control-M/Tape loads the specified rule table from the specified library.</p> <p>To replace all currently active rules with a new (updated) copy of the rules, issue operator command:</p> <p>S CTTINIT , PARM= ' MODE=RELOAD , TBLT=RULE '</p> |
| MODE=RELOAD,<br>TBLT=POOL         | <p>When Control-M/Tape is initialized, it reads pool definitions from the member referenced by the DAPOOLS DD statement in the CTTINIT procedure. These pools are defined using the Control-M/Tape Pool Definition screen.</p> <p>If you modified or added pools and you want to replace the currently active pools with a new (updated) copy of the pools, issue operator command:</p> <p>S CTTINIT , PARM= ' MODE=RELOAD , TBLT=POOL '</p>                                                                   |

| Parameter                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MODE=RELOAD,<br>TBLT=VAULT | <p>When Control-M/Tape is initialized, it reads vault definitions from the member referenced by the DAVLTS DD statement in the CTTINIT procedure. These vaults are defined using the Control-M/Tape Vault Definition screen.</p> <p>If you modified or added vaults and you want to replace the currently active vaults with a new (updated) copy of the vaults, issue operator command:</p> <pre>S CTTINIT , PARM= ' MODE=RELOAD , TBLT=VAULT '</pre>                                                                                                                  |
| MODE=RELOAD,TB<br>LT=PARM  | <p>The following CTTARM options can be modified while Control-M/Tape is active. There is no need to shut down Control-M/Tape.</p> <p>ABENDACT, BLPDEF, CNGMSGID, DAYTIME, DEFABEND, DEFEXPDT, DSNMCHK, DYND, DYNVOL, EXPDTDDN, EXPDTYPE, EXTRNVOL, LBLROUTC, MODE, MSGFMT, NLASKOP, OVERJCL, PARALLEL, RBTYPE, RECREATE, RTNUPD, SCRPROT, SMSINTR, STKDEFFT, STKMODE, STKSCHL, STKTEST, VLTBYDS1, X98ASKOP</p> <p>To modify these options, modify the CTTARM member, then issue the following operator command:</p> <pre>S CTTINIT , PARM= ' RELOAD , TBLT=PARM '</pre> |
| MODE=RELOAD,<br>TBLT=VIEW  | <p>When Control-M/Tape is initialized, it reads view definitions from the VIEWSDEF member in the Control-M/Tape PARM library.</p> <p>If you modified or added views and you want to replace the currently active views with a new (updated) copy of the views, issue the following operator command:</p> <pre>S CTTINIT , PARM= ' MODE=RELOAD , TBLT=VIEW '</pre>                                                                                                                                                                                                       |

## Parameters Relating to Operating System Interfaces

**Table 218 Parameters Relating to Operating System Interfaces**

| Parameter   | Description                                                                                                                                                                                                                                                                        |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MODE=VERIFY | <p>Verifies that Control-M/Tape operating system interfaces can be applied and the SVC can be installed.</p> <p>This mode can be used during Control-M/Tape installation, or when bringing up a new OS/390 or z/OS version, to determine if Control-M/Tape can be initialized.</p> |

| Parameter  | Description                                                                                                                                                                                                                                                    |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MODE=CHECK | Checks if Control-M/Tape operating system interfaces are already applied and the SVC already installed.<br><br>Because Control-M/Tape has no active address space (job or started task) in the system, this mode is used to determine if Control-M/Tape is up. |

VERIFY can be executed only if the Control-M/Tape Real-Time environment is not active. CHECK can be executed regardless of whether Control-M/Tape is active.

## Parameters Relating to Operating Status

**Table 219      Operating Status Parameters**

| Parameter     | Description                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MODE=DORM     | Makes Control-M/Tape temporarily dormant. After this command is issued, Control-M/Tape does not intervene in any job, does not check expiration dates, and so on.<br><br>The Control-M/Tape environment (Control-M/Tape tables, rules, I/O control blocks, and so on) is saved.                                                                                                                           |
| MODE=SUSPEND  | Temporarily suspends removable media activity. After this command is issued, all jobs that access removable media wait for an operator reply specifying how to proceed. The operator can specify that processing must continue without Control-M/Tape, wait for a RESUME command, or abend.<br><br>The Control-M/Tape environment (Control-M/Tape tables, rules, I/O control blocks, and so on) is saved. |
| MODE=RESUME   | Causes normal Control-M/Tape operations to resume after MODE=DORM or MODE=SUSPEND commands were issued.                                                                                                                                                                                                                                                                                                   |
| MODE=STOPSTK  | Stops the Dynamic Stacking facility.                                                                                                                                                                                                                                                                                                                                                                      |
| MODE=STARTSTK | Starts or restarts the Dynamic Stacking facility.                                                                                                                                                                                                                                                                                                                                                         |

## Problem Resolution Parameters

Use the following parameters only if requested by BMC Customer Support:

**Table 220 Problem Resolution Parameters**

| Parameter     | Description                                                                                                                                                                                                          |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TRCLEVEL (TL) | Trace level. A numeric value from 0 to 255 can be specified. <ul style="list-style-type: none"> <li>▪ 0 - No trace messages are printed.</li> <li>▪ A number greater than 0 - Trace messages are printed.</li> </ul> |
| TRCJOB (TJ)   | Name of the job for which tracing must be enabled. If TRCJOB is not specified, or if TRCJOB =ALL is specified, tracing is enabled for all jobs.                                                                      |

Sample JCL for procedure CTTINIT can be found in the IOA Procedure library. The following table describes the DD statements that are important for managing and maintaining Control-M/Tape:

**Table 221 DD Statements**

| Parameter | Description                                                                                                                                                                                                                                                                         |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DARULLST  | References a member that contains a list of rules that must be loaded upon initialization or reload. <ul style="list-style-type: none"> <li>* CTT.V900.RULES BKPRULE ORDER</li> <li>* CTT.V900.RULES SAVRULE ORDER</li> </ul> For additional information see the following section. |
| DAPOOLS   | References a member that contains pool definitions. By default, this member is \$\$POOL in the Control-M/Tape PARM library. Several pool definition members can be concatenated and specified with this DD statement.                                                               |
| DAVLTS    | References a member that contains vault definitions. By default, this member is \$\$VAULT in the Control-M/Tape PARM library. Several vault definition members can be concatenated and specified with this DD statement.                                                            |



## Loading of Rules

When Control-M/Tape is started (or rules need to be reloaded), Control-M/Tape attempts to read a list of rule tables from the member referenced by the DARULLST DD statement. These rule tables are automatically loaded by Control-M/Tape. The supplied default member RULLIST is in the Control-M/Tape PARM library. Each line in the list has the following format:

```
date library table operation
```

where

- *date* is the date of the rule table. If a specific date is designated, it is used to analyze the Basic Scheduling parameters. The date format is mmddyy, ddmmyy, or yymmdd (depending on the site standard).  
Specifying an asterisk (\*) indicates the current Control-M/Tape Working Date.
- *library* is the name of the library in which the rule table is located.
- *table* is the name of the rule table.
- *operation* is the operation to be performed on the rules in the specified table. Valid values are
  - ORDER: Each rule's Basic Scheduling parameters are compared to the specified date (or the current Control-M/Tape Working Date when \* is specified). If the rule must be scheduled on that date, it is loaded by Control-M/Tape and activated. Default.
  - FORCE: Each rule is loaded by Control-M/Tape and activated. Use the FORCE option when you do not want to use Control-M/Tape scheduling options.

For every line in the list, Control-M/Tape loads the specified rule table from the specified library.

## Termination

Control-M/Tape must be in operation from system startup to shutdown (that is, all the time), so that it can intercept all removable media management activities. Information about jobs that access removable media is not recorded while Control-M/Tape is inoperative.

When Control-M/Tape is terminated, a check is triggered for active jobs that currently access removable media in the system. If such jobs exist, the operator is prompted to cancel the termination, retry the termination, or continue (force) the termination.

When Control-M/Tape is terminated, all traces of the Control-M/Tape real-time environment are removed from the system.

## New Day Procedure

The New Day procedure is the primary mechanism used to perform daily maintenance on the Control-M/Tape Media Database and related files.

The New Day procedure, called CTTDAY, can be activated automatically by a scheduler (for example, Control-M) at a predefined time each day. The New Day procedure can also be activated manually by submitting a job.

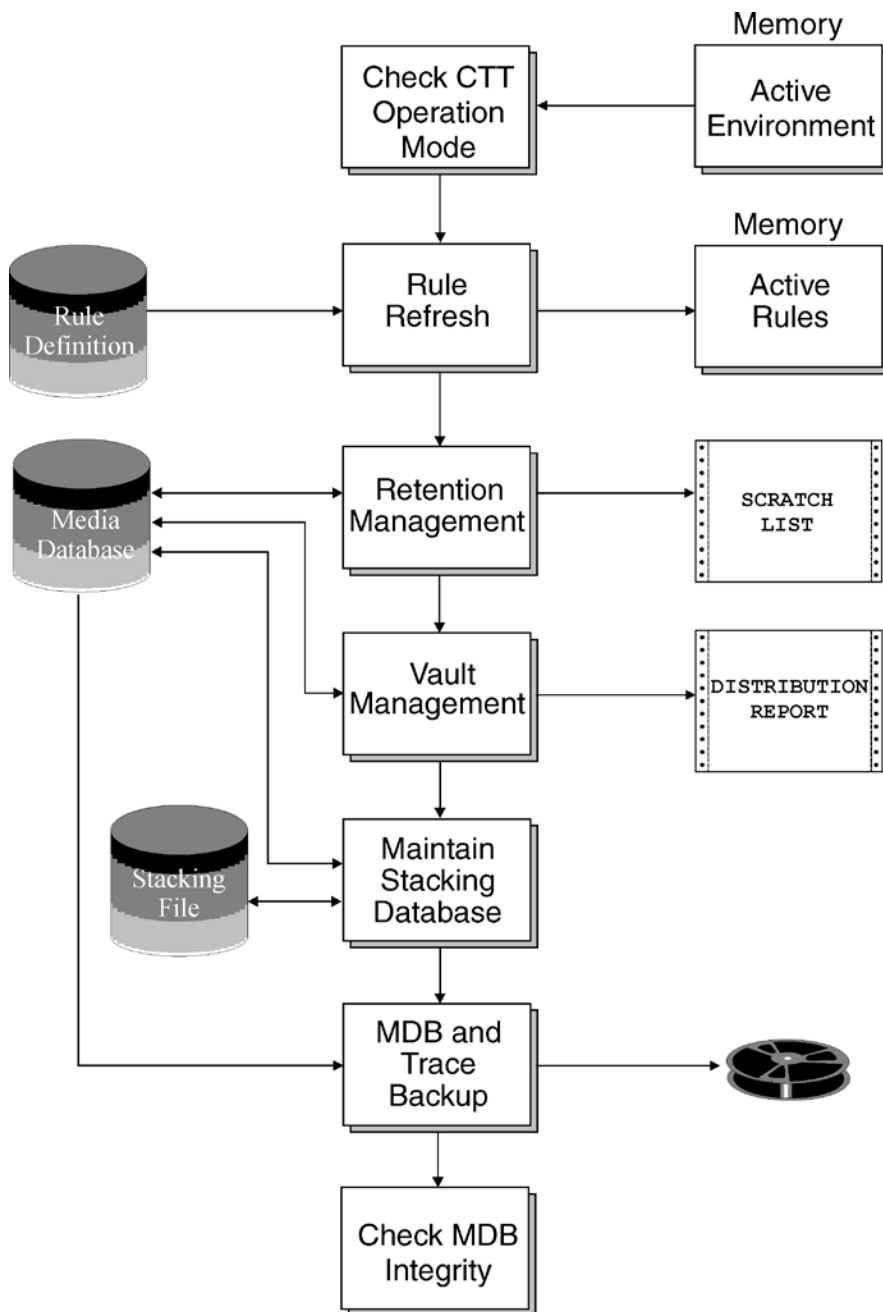
## New Day Functions

The maintenance operations illustrated and described in this section are performed by the New Day procedure.

### New Day Processing

The order of processing may be changed in certain situations.

**Figure 74 New Day Phases Processing**



**Table 222      New Day Procedure Phases**

| Phase                                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check Control-M/<br>Tape<br>Operation Mode | The CTTINIT procedure (with MODE=CHECK specified) checks whether Control-M/Tape is active, and whether Dynamic Dataset Stacking is operational. This step also checks the expiration date of the Control-M/Tape password.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Rule Refresh                               | <p>The CTTINIT procedure can be invoked with the MODE parameter set to RELOAD to refresh the Control-M/Tape active rules. The user must consider whether to include this step in the New Day procedure. You must take the following considerations into account:</p> <ol style="list-style-type: none"> <li>1. Rules are automatically refreshed when Control-M/Tape is initialized (usually when an IPL is performed). If a rule definition is changed (in the Definition Library), the modified definition takes effect only when the next IPL is performed (monthly, weekly, and so on).</li> <li>2. The retention management and vault management utilities optionally load rules from the library as their first step. In this case, all subsequent retention and vault decisions are based on refreshed rules.<br/><br/>Although these utilities may operate with new, refreshed rules, the Control-M/Tape real-time environment continues to use the older, original rules in memory.<br/><br/>To avoid confusion over which rule definitions are being accessed, the user can implement the Rule Refresh option at any time. Because of this situation, a rule refresh step is usually performed as the first step of the New Day Procedure.</li> <li>3. The Control-M/Tape Rule Scheduling facility (enabled by specifying Scheduling parameters while defining rules) allows you to define when rules must be activated based on calendars and scheduling criteria. For example, this allows you to specify a different retention period for the same dataset when that dataset is created on weekdays and weekends.</li> </ol> |
| Retention<br>Management                    | The CTTRTM utility scans the Media Database and determines which volumes or datasets have expired. These volumes are marked as scratch volumes in the Control-M/Tape Media Database. This utility can also produce various reports concerning the current status of scratch volumes in the Media Database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Vault Management                           | The CTTVTM utility determines which volumes must be moved, and where to move them. This utility can also produce a distribution report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Phase                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maintain Stacking Database      | The CTTSTK utility updates the Stacking database with new statistics collected on each dataset. This utility uses data from the Trace file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Media Database and Trace Backup | <p>This backup consists of the following steps:</p> <ol style="list-style-type: none"> <li>4. Writing a Started Media Database Backup record to the Trace file.</li> <li>5. Backing up the Media Database data file and the Trace file using any standard backup utility. In the supplied job, the IEBGENER utility is used for the trace backup, and the ADRDSSU utility is used for the Media Database backup.</li> <li>6. Writing an Ended Media Database Backup record to the Trace file.</li> </ol> <p>This backup can be used if a Media Database restore is required. For further information see <a href="#">Repository Backup and Recovery</a> (on page 652).</p> |
| Check Media Database Integrity  | The CTTIDB utility is run to check the Media Database for logical integrity errors. For more information, see the CTTIDB utility in the <i>INCONTROL for z/OS Utilities Guide</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Repository Structure

The Control-M/Tape Repository is composed of the following files:

- media database
- trace file
- stacking database

Place Control-M/Tape databases and the Trace file only on disks that do not get defragmented while Control-M/Tape is running. If your site uses a disk defragmenter, place the Control-M/Tape TRC, MDBD, MDBI, STKD and STKI datasets in an "exclude list" to prevent the defragmenter from processing them.

Control-M/Tape Media and Stacking databases are managed by IOA Access Methods. The following IOA Access Method restrictions exist for the Control-M/Tape database:

- Allocation of new Media Database extensions is not automatically defined. They can only be defined manually, using the IOADBF utility with the EXTEND option.
- Secondary allocations for the index file are not allowed.
- Dual database option is not allowed.
- The data files must be defined with TYPE=F in the IOA Access Method member definition because TYPE=V is not allowed for Control-M/Tape data file.

## Media Database Structure

The Control-M/Tape Media Database consists of the following primary physical files:

**Table 223 Control-M/Tape Media Database Files**

| File       | Description                                                                  |
|------------|------------------------------------------------------------------------------|
| Data file  | Contains all required data about volumes and datasets in the Media Database. |
| Index file | Provides keyed access to data in the Data file.                              |

These files are managed by the IOA Access Method. For more information, see [IOA Access Method](#) (on page 25).

Another file, the Trace file, is used to track updates and facilitate recovery of the Media Database. (For more information, see [Structure of the Trace File](#) (on page 644).)

The Data and Index files are allocated by Control-M/Tape activities using the following DD statements:

**Table 224 DD Statements for Allocating the Data and Index Files**

| File       | DD Statement       |
|------------|--------------------|
| Data file  | DD statement DAMDB |
| Index file | DD statement DAMDI |

Because the user can define more than one Media Database extent and because the standard QSAM services cannot determine how many extents exist, you cannot read these files using these services. Instead, access the Media Database using only the standard macros described in [Control-M/Tape Application Programming Interface](#) (on page 658).

## Data File Contents

The Data file contains all the data about any volume or dataset. In Control-M/Tape, unlike other tape management systems, volume information and dataset information are stored in the same file, but with different record types and formats.

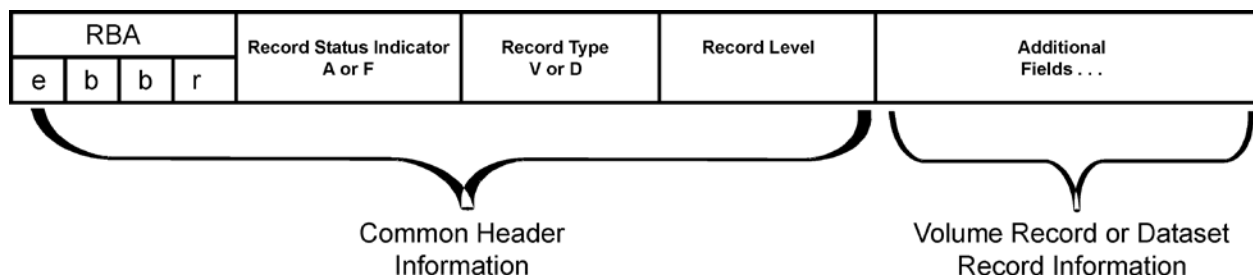
The following table lists the two most common record types in the Control-M/Tape Data file:

**Table 225 Common Data File Record Types**

| Record Type    | Description                               |
|----------------|-------------------------------------------|
| Volume record  | Contains information regarding a volume.  |
| Dataset record | Contains information regarding a dataset. |

Additional record types and formats in the database are not described because they are not relevant for most users.

Volume and dataset records are mapped using assembler macros CTTDVL and CTTDDS, respectively. All record types in the Data file have a common header at the beginning of the record. This header contains the following information about the record:

**Figure 75 Sample Record in the Data File****Table 226 Fields in the Data File Record**

| Record                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RBA                     | Internal record location identifier (explained later in this chapter). Each record in the Data file is assigned an RBA that indicates the location of the record in the Data file. The format of the Control-M/Tape RBA is ebbrr. The first byte identifies the extent file number, the next two bytes identify the block number in the Data file, and the last byte identifies the record number in that block.<br><br>Access to a specific Data file record can be performed using its RBA if known (or using the index, as explained later in this chapter). Access of a data record using its RBA is known as "non-keyed access". |
| Record Status Indicator | Indicates whether the record is active or free.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Record Type             | Indicates whether the record is a volume or dataset record.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Record Level            | Used internally by Control-M/Tape to identify the level of the record.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## Fields in the Data File

Some of the more important fields in the volume and dataset records in the Data file are listed in the table below. Each field is assigned an internal name (a symbol in a DSECT that describes the record) and an external name (a logical name used by the user in INCLUDE and EXCLUDE statements). For a comprehensive list of these fields, see [D Logical Field Names for the Control-M/Tape Repository](#) (on page 789) and the CTTDVL and CTTDDS members in the IOA MAC library.

**Table 227 Commonly Referenced Volume Record Fields**

| Internal Name   | External Name  | Description                                                               |
|-----------------|----------------|---------------------------------------------------------------------------|
| DVLRBA          | DVLRBA         | RBA of the record.                                                        |
| DVLRID          | DVLRID         | Record status (A-Active, F-Free).                                         |
| DVLRTYPE        | DVLRTYPE       | Record type (V-Volume record).                                            |
| DVLSTAT DVLSTA2 | VOLSTAT VOLIND | Various status and flag bytes.                                            |
| DVLFLG1         | VOLFLAGS       | Various status and flag bytes.                                            |
| DVLVOLSR        | VOLSER         | Volume serial number.                                                     |
| DVLLTYPE        | LBLTYP         | Label type of the volume.                                                 |
| DVLACTD#        | ACTIVEDS       | Number of active (non-expired) datasets on the volume.                    |
| DVLLBLNM        | LBLNUM         | Label number of the last active dataset on the volume.                    |
| DVLVSEQ         | VOLSEQ         | Volume sequence number for a volume that is part of a multi-volume chain. |
| DVLNEXT         | NEXTVOL        | Next volume (of the multi-volume chain).                                  |
| DVLPREV         | PREVVOL        | Previous volume (of the multi-volume chain).                              |
| DVLFIRST        | FIRSTVOL       | First volume (of the multi-volume chain).                                 |

**Table 228 Commonly Referenced Dataset Record Fields**

| Internal Name | External Name | Description                                                            |
|---------------|---------------|------------------------------------------------------------------------|
| DDSRBA        | DDSRBA        | RBA of the record.                                                     |
| DDSRID        | DDSRID        | Record status (A-Active, F-Free).                                      |
| DDSRTYPE      | DDSRTYPE      | Record type (D-Dataset record).                                        |
| DDSSTAT       | DSSTAT        | Various status bytes                                                   |
| DDSFLG1       | DSFLAGS       | Various flag bytes.                                                    |
| DDSDSN        | DSNAME        | Dataset name.                                                          |
| DDSLBLNM      | DSLABEL       | Label number (dataset sequence number on the tape).                    |
| DDSVOLSR      | DSVOLSER      | Volser of the dataset (or the first volser of a multi-volume dataset). |
| DDSVOLS#      | VOLSNUM       | Number of volumes in the dataset (if the file spans multiple volumes). |

## Index File Contents

The Index file makes keyed access of records in the Data file possible. The Index file contains records that, in turn, contain index elements. Each index element contains the following fields:

**Table 229 Index Element Fields**

| Element         | Description                                                                                            |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Key Type        | D, V, or L (see the following topic).                                                                  |
| Key             | Information that used to identify a record in the data file. Each index element contains one key only. |
| RBA             | Internal record location identifier of the relevant record in the Data file.                           |
| Additional info | Bytes used by Repository-handling mechanisms.                                                          |

The index records are saved by the IOA Access Method in the file as compressed.



## Key Types

Each index element contains a particular type of key that is used for accessing records in the data file. The following table describes the full and partial keys of each type:

**Table 230 Key Types**

| Key | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V   | Used to index volume records in the Data file. One index element containing one V-type key is created for each volume record in the Data file. The full V-type key for each volume record is the full volume serial number. This is a unique key.                                                                                                                                                                                                                               |
| D   | Index to dataset records in the Data file. One index element containing one D-type key is created for each dataset record in the Data file. The full D-type key for each dataset record is the full dataset name. Because duplicate dataset names may exist in the media library, this is a non-unique key (that is, more than one index element may exist with the same D-type key).                                                                                           |
| L   | Index to dataset records in the Data file. An element with an L-type key is created for each volume on which a specific dataset resides. For example, if a dataset record indicates that the dataset spans three volumes, three L-type keys (one for each volume) are created to reference that dataset record. The full L-type key is comprised of the full volume serial number and the full file sequence number (label) of the dataset on the volume. This is a unique key. |

Depending on the function being performed when accessing the Index file, you can specify a full key or a partial key. For more information, see [Index File Contents](#) (on page 640).

A partial key is shorter than the full length of the key in the index file. The most common usage of a partial key is the specification of a prefix (for example, dataset name prefix instead of a full dataset name). Partial keys can also be used when all necessary information is not available.

All index elements have the same fixed length, which is determined by the index elements with D-type keys because the D-type key is the longest full key (that is, the dataset name).

Index element length exceeds the length of the longest key because index elements contain additional bytes that are used by the Control-M/Tape Repository-handling mechanisms.

Index elements with V-type keys are mapped using assembler macro CTTDVX. Index elements with D-type keys are mapped using assembler macro CTTDDX. Index elements with L-type keys are mapped using assembler macro CTTDLX.

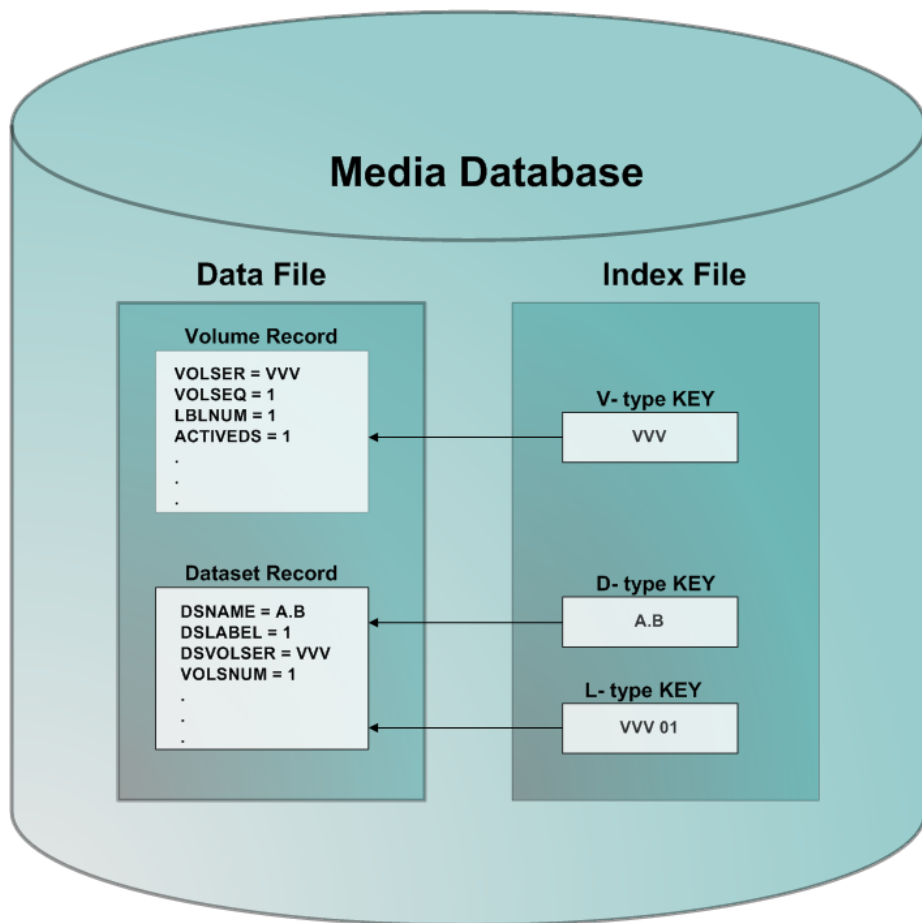
## Volume and Dataset Relations

The Media Database Data file contains a record for each volume and a record for each dataset. Fields in these records, and indexes of various types, are used to describe the relationships between a volume and its respective datasets. These fields and indexes also describe the relationship between volumes in a multi-volume chain.

The examples below show the relationship between the relevant fields in the volume records, dataset records, and the index elements that reference these records.

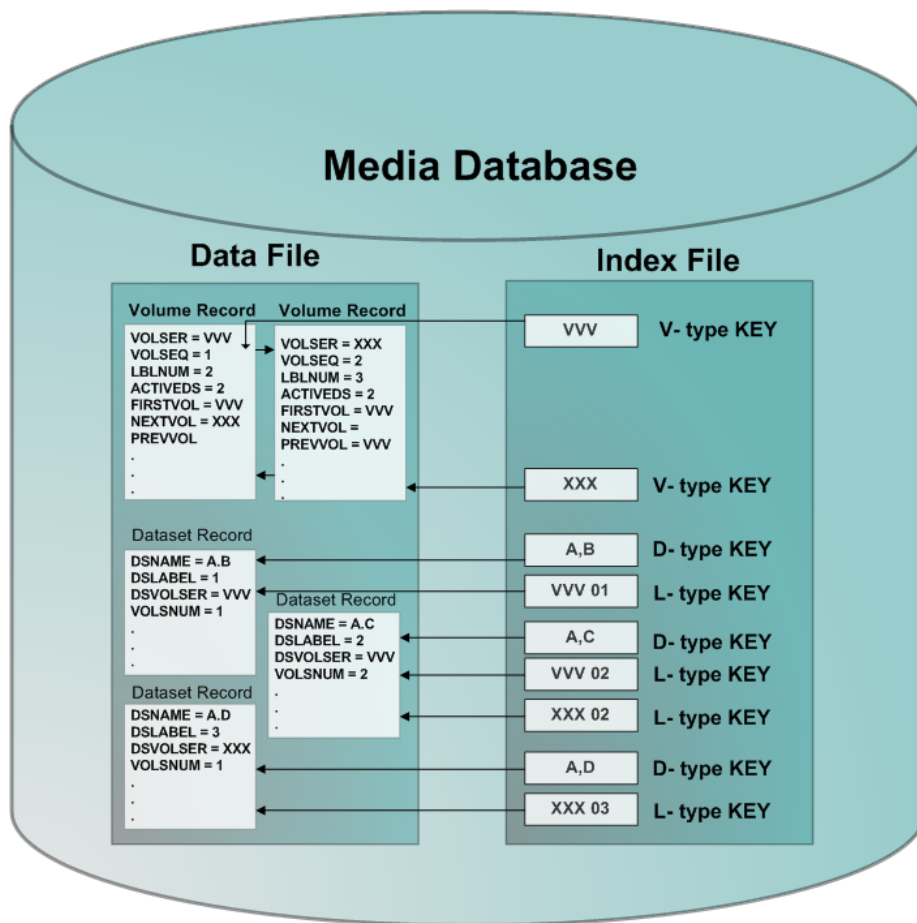
This example shows the record and index configuration for a single volume (VVV) containing only one dataset (called A.B).

**Figure 76 Volume and Dataset Relations – Example 1**



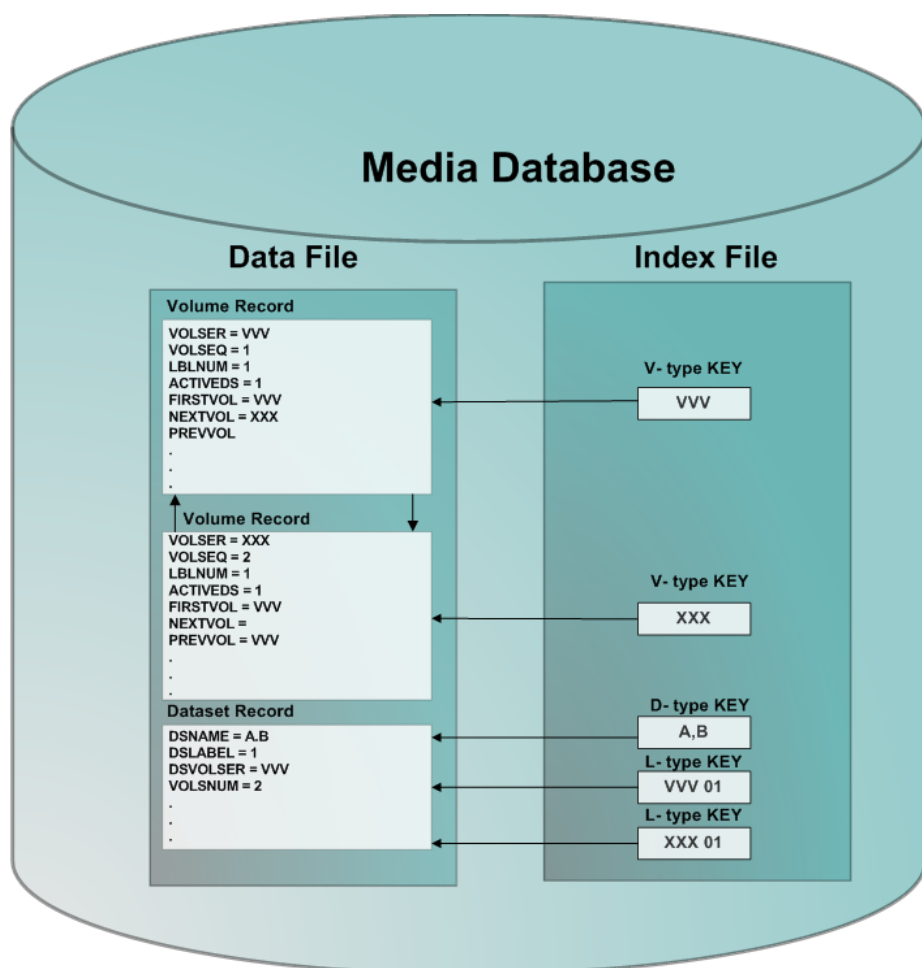
This example shows the record and index configuration for a single dataset (A.B) that spans two volumes (VVV and XXX).

**Figure 77 Volume and Dataset Relations – Example 2**



This example shows the record and index configuration for a group of datasets (A.B, A.C, and A.D) contained in a multi-volume chain (volumes VVV and XXX). Dataset A.B resides on volume VVV. Dataset A.C starts on volume VVV and continues on volume XXX. Dataset A.D resides on volume XXX.

**Figure 78 Volume and Dataset Relations – Example 3**



## Structure of the Trace File

The Trace file is used for the following primary purposes:

- to track updates of the Media Database
  - This information is used to facilitate recovery of the Media Database when necessary.
- to serve as a queue for requests to be performed by the IOA Functional monitor

The Trace file is automatically maintained by Control-M/Tape mechanisms that handle the Media Database and the requests to the IOA Functional monitor.

The length of logical records in the Trace file can vary, depending on the type of information in the record.

Logical records in the Trace file are composed of a header (mapped by macro CTTARC) followed by the record data (mapped by the macro relevant for the type of traced action).

The Trace file is processed as a cyclic file. When the file is full new records overwrite the oldest logical records. When the physical end-of-file is reached, the next record is written on the first physical record.

The Trace file is not a database and it therefore is not managed as an IOA Access Method database.

### Fields in the Trace File

The following table lists some of the more important fields in the Trace file. For a comprehensive list of these fields, see [D Logical Field Names for the Control-M/Tape Repository](#) (on page 789) and the IOA MAC library.

**Table 231 Fields in the Trace File**

| Field    | Description                                               |
|----------|-----------------------------------------------------------|
| ARCLL    | Record length.                                            |
| ARCTYPE  | Record type.                                              |
| ARCIDENT | Name of the component that generated this record.         |
| ARCSTAMP | Record time stamp (that is, when the record was created). |
| ARCDATA  | Actual information that is recorded.                      |

The Trace file can be copied to a sequential variable-blocked file, enabling the output to be formatted in a number of different ways. (For more information, see the description of the CTTACP utility in the *INCONTROL for z/OS Utilities Guide*.)

## Structure of the Stacking Database

The Stacking Database contains statistical information about datasets processed by Control-M/Tape. This information is gathered from various locations (for example, the Media Database, or the Trace file) by the CTTSTK utility. The information in this file is used by the Dynamic Dataset Stacking facility in the real-time environment.

The Stacking Database is composed of the following physical files:

**Table 232 Stacking Database Files**

| File       | Description                                                                  |
|------------|------------------------------------------------------------------------------|
| Data file  | Contains statistical information about datasets processed by Control-M/Tape. |
| Index file | Provides keyed access to data in the Data file.                              |

These files are managed by the IOA Access Method. For more information, see [IOA Access Method](#) (on page 25).

Records in the Data and Index files are mapped by assembler macros CTTSTK and CTTSTX, respectively.

New Stacking Database extents are not automatically defined. They can only be defined manually, using the IOADBF utility. In addition, Stacking Database records are of fixed length only.

## Data File Contents

The Data file contains statistical information about datasets that have been processed by Control-M/Tape. A dataset is identified by its name and the name of the job that created the dataset.

All record types in the Data file have a common header at the beginning of the record. This header contains the following information about the record:

**Table 233 Header Information in Data File**

| Type                    | Description                                                                                                                                                                                                                                                        |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RBA                     | Internal record location identifier. The format of the Control-M/Tape RBA is ebbrr. The first byte identifies the extent file number, the next two bytes identify the block number in the Data file, and the last byte identifies the record number in that block. |
| Record Status Indicator | Indicates whether the record is active or free.                                                                                                                                                                                                                    |

Each record in the Data file is assigned an RBA that indicates the location of the record in the Data file.

Access to a specific data file record can be performed using its RBA if known, or using the index. Access of a data record using its RBA is known as "non-keyed access."

Do not confuse the term "RBA," as used in this chapter, with the term "Relative Byte Address" used in IBM literature.

## Fields in the Data File

The following table lists some of the more important fields in the Data file. For a comprehensive list of these fields, see the IOA MAC library.

**Table 234 Data File Fields**

| Field    | Description                                       |
|----------|---------------------------------------------------|
| STKKEY   | Record key (the dataset name and job name).       |
| STKOBS   | Accumulated number of observations.               |
| STKPREDC | Predicted compressed size of the dataset in KB.   |
| STKPREDU | Predicted uncompressed size of the dataset in KB. |

## Index File Contents

The Index file contains index records. These index records enable keyed access to records in the Data file.

## Repository Maintenance

### Verifying Data Integrity of Media Databases

In the Control-M/Tape Media Database, data of different types are stored in separate records that are linked using the following mechanisms:

- data fields in data records that reference other data records  
For example, field DDSVOLSR in a dataset record indicates the record of the volume containing the beginning of the dataset.
- index records that link data records (for example, the L-index record)
- counters within data records (for example, field DVLACTD# in a volume record indicates the number of datasets in the volume)

Media Database integrity is the degree to which the links between data or index records are free of errors. A high level of integrity is necessary to ensure smooth processing by Control-M/Tape. Use the CTTIDB utility to check Media Database logical integrity on a daily basis (for example, as a part of the Control-M/Tape New Day Procedure).

### Causes of Media Database Integrity Errors

As a rule, normal tape processing by Control-M/Tape does not cause integrity errors. However, such errors can be caused by external events that interrupt Control-M/Tape processing, which result, for example, in partially updated records. Some common causes of integrity errors are

- system crash
- cancellation of a job that accesses tapes in the middle of its processing
- interruption of a Control-M/Tape utility that updates records in the Media Database
- processing Control-M/Tape databases or the Trace file by a defragmentation program while Control-M/Tape is running

### Examples of Errors Due to Interruption of Control-M/Tape Processing

- A volume record points to the next record in a multi-volume chain (using the NEXTVOL field), but that volume does not point back (field PREVVOL).
- A dataset does not span the number of volumes indicated in the record for that dataset.
- An L-index points to a scratch volume.

Integrity errors should not occur often. However, if the CTTIDB utility detects an unusually large number of integrity errors, you should immediately investigate the cause of these errors and fix the problem.

## Recovery From Integrity Errors

Some integrity errors are automatically resolved by Control-M/Tape:

L-indexes that point to a scratch volume are removed as soon as the scratch volume is mounted in response to a scratch tape request.

Some utilities (that is, CTTRTM and CTTVTM) have restart capabilities that allow them to continue from the point at which the utility was interrupted.

Integrity errors that are not automatically fixed by Control-M/Tape must be handled by first studying the nature of the error, and then determining which Media Database updates must be performed to correct the error.

## Analyzing an Integrity Error

Check the output of the CTTIDB utility every day. If a logical integrity error is detected, you should be able to determine the type of error, and which data or index records are involved, from the output of the utility. Following is a list of the most common logical integrity errors detected using the CTTIDB utility:

- Information in a data record and corresponding information in an index record do not match.
- A counter field in a data record has an incorrect value.
- A group of volumes is chained incorrectly or some volumes in the chain have conflicting attributes (for example, vaulting criteria).
- Data fields linking data records point incorrectly.
- A scratch volume points to, or is pointed to, by an active volume record.

Choose the method used to correct the error based on information in the output of the CTTIDB utility and, optionally, in record data viewed using the Inquire or Update Media Database screen (Screen TI).

## Correcting Integrity Errors

Logical integrity errors are corrected by updating the data records and/or index records that are in error. For details, see the chapter about verifying media database integrity in the *Control-M/Tape Implementation Guide*.

Errors involving data records must be corrected one at a time, using the CTTMUP utility. After fixing each error, it is recommended that you rerun the CTTIDB utility, because fixing one error often eliminates other errors. This can be done automatically by specifying CHECK=YES in the TYPERUN statement of the CTTMUP utility. The output of the CTTIDB utility after it is rerun indicates the integrity errors that remain.

The CTTMUP utility can also be used to fix most index related problems by rebuilding the indexes for a volume, a dataset, or a group of volumes and datasets.

If a large number of index errors are found in the Media Database, consider fixing these errors by rebuilding the index component using the CTTBIX utility.

If you choose to rebuild the index of the Media Database, you must first halt all tape processing.

For a detailed description of the CTTIDB, CTTMUP and CTTBIX utilities, see the *INCONTROL for z/OS Utilities Guide*.



## Manual Update of the Media Database

Manual update of the Media Database is accomplished using the CTTMUP utility. This utility can be used to add new volume or dataset records to the Media Database, or to fix logical integrity errors detected using the CTTIDB utility.

Before using the CTTMUP utility, it is important to understand the structure of the Media Database. For more information, see [Media Database Structure](#) (on page 637). Attempting to fix logical integrity errors without properly understanding the Media Database structure can lead to even more integrity errors.

When updating a volume record, the CTTMUP utility does not always automatically update the corresponding dataset records, and vice versa. When updating data fields that are used to link records, be sure to update all relevant records so that no new logical integrity errors are created. For example, when you add a dataset to a volume, verify that the new number of datasets is recorded in the volume record.

When updating groups of volumes (multivolume chains), use the group statements (prefixed "GRP") to implement the desired change in the records of all the volumes in the group.

After performing the necessary updates, it is highly recommended that you run the CTTIDB utility to verify the results. This can be accomplished by running the utility manually, or by including CHECK=YES in the TYPERUN statement of the CTTMUP utility. For more information about manual update of the Media Database, see the CTTMUP utility in the *INCONTROL for z/OS Utilities Guide*.

## Enlarging the Media Database

Occasionally, it might be necessary to increase the size of the Media Database (MDB). This situation arises if one of the Media Database components (index or data) is almost at maximum capacity, or if extensive additions to the Media Database must be made in the near future.

The user has two options for enlarging the Media Database:

- Reallocate the current extent by increasing the number of blocks or the block size.
- Define a new Media Database extent.

### Reallocating the current extent

1. Shut down Control-M/Tape using the operator command `S CTTINIT, PARM= 'MODE=TERM'`.
2. Unload the Media Database data component using the IOADUL utility. The output of this utility is loaded to the new and larger Media Database.
3. Rename the production Media DATA and INDEX components. For example, rename the CTT.V900.MDBD.E000 file to CTT.V900.MDBD.E000.OLD. This file is kept as a backup for the Media Database.
4. Using ICE, select Customization. Enter **CTT** in the **Product** field, and select Product Customization.
5. Select major step 2, "Customize Control-M/Tape Datasets," and then minor step 1, "Media Database Space Calculation."
6. Calculate the space needed for your Media Database, and update the definitions on the screen. To calculate the amount of space needed, see the Control-M/Tape installation chapter of the *INCONTROL for z/OS Installation Guide: Installing*.

The Media Database can be enlarged by increasing the number of blocks, by enlarging the block size, or both.

7. Select minor step 4, "Save parameters into Product Libraries."
8. Select minor step 5, "Create and Init Media Database," and submit the job. This job allocates and formats a new Control-M/Tape Media file.
9. Reload the Media Database data component into the new and larger data component, using the ILOAD utility.
10. Run the CTTBIX utility.
11. Restart Control-M/Tape using the operator command `S CTTINIT,PARM='MODE=INIT'`.

## Defining a new extent

1. Shut down Control-M/Tape using the operator command `S CTTINIT,PARM='MODE=TERM'`.
2. Create and format a new Media Database data component by running the IOADBF utility with the FUNC parameter set to EXTEND. Use the sample member CTTEMDB in the CTT..JCL library.
3. Restart Control-M/Tape using the operator command `S CTTINIT,PARM='MODE=INIT'`.

## Enlarging the Trace File

At times, it may be necessary to increase the size of the Control-M/Tape Trace file. This situation arises if the Trace file often reaches maximum capacity, or if an increase in tape activity at your site is imminent.

➤ To enlarge the Trace file, perform the following steps:

1. Shut down Control-M/Tape using the operator command `S CTTINIT,PARM='MODE=TERM'`.
2. Back up the active Trace file using the Control-M/Tape CTTACP utility, the IBM IEBGENER utility, or any similar tool.
3. Rename the production Trace file. For example, rename the CTT.V900.TRC file to CTT.V900.TRC.OLD.
4. Using ICE, select Customization. Enter **CTT** in the **Product** field, and select Product Customization.
5. Select major step 2, "Customize Control-M/Tape Datasets," and then minor step 3, "Trace File Space Calculation."
6. Calculate the space needed for the new Trace File and update the definitions on the screen. To calculate the space needed, see the planning and space calculation step and the trace file calculation topic in the Control-M/Tape installation chapter of the *INCONTROL for z/OS Installation Guide*.

Note: The Trace file can be enlarged either by increasing the number of blocks, by enlarging the block size, or both.

7. Select minor step 4, "Save parameters into Product Libraries."
8. Select minor step 7, "Create and Init Trace File," and submit the job. This job allocates and formats a new Control-M/Tape Trace file.
9. Copy the old Trace file to the new and larger Trace file using the CTTACP utility. Following is an example of CTTACP activation:

**Figure 79 CTTACP Activation Example**

```
//name JOB , IOA, CLASS=A, MSGCLASS=X
//*
//* COPY ONE Control-M/TAPE TRC DATASET TO ANOTHER TRC
//*
//TT2ACP EXEC CTTACP,
//      TRCIN=' CTT. V900. TRC. OLD' ,
//      TRCOUT=' CTT. V900. TRC'
//SYSIN DD *
//      COPY FROM=TRACE, TO=TRACE
//
```

10. Restart Control-M/Tape using the operator command `S CTTINIT, PARM= 'MODE=INIT'.`

## Enlarging the Stacking Database

At times, it may be necessary to increase the size of the Stacking Database. This situation arises if one of the Stacking Database components (index or data) is almost at maximum capacity, or if extensive additions to the Stacking Database need to be made in the near future.

The user has two options for enlarging the Stacking Database:

- Reallocate the current extent by increasing the number of blocks or the block size.
- Define a new Stacking Database extent.

### Reallocating the current extent

1. Shut down Control-M/Tape using the operator command `S CTTINIT, PARM= 'MODE=TERM'.`
2. Unload the Stacking Database data component using the ILOAD utility. The output of this utility is loaded to the new and larger Stacking Database.
3. Rename the production Stacking DATA and INDEX components. For example, rename the CTT.V900.STKD.E000 file to CTT.V900.STKD.E000.OLD. This file is kept as a backup for the Stacking Database.
4. Using ICE, select Customization. Enter **CTT** in the **Product** field, and select Product Customization.
5. Select major step 2, "Customize Control-M/Tape Datasets," and then minor step 2, "Stacking Database Space Calculation."
6. Calculate the space needed for your Stacking Database, and update the definitions on the screen. To calculate the amount of space needed, see the stacking database calculation topic in the Control-M/Tape installation chapter of the *INCONTROL for z/OS Installation Guide*.

The Stacking Database can be enlarged by increasing the number of blocks, by enlarging the block size, or both.

7. Select minor step 4, "Save parameters into Product Libraries."
8. Select minor step 6, "Create and Init Stacking Database," and submit the job. This job allocates and formats a new Control-M/Tape Stacking file.
9. Reload the Stacking Database data component into the new and larger data component, using the ILOAD utility.
10. Run the CTTDBIB utility.

11. Restart Control-M/Tape using the operator command `S CTTINIT,PARM='MODE=INIT'`.

## Defining a new extent

1. Shut down Control-M/Tape using the operator command `S CTTINIT,PARM='MODE=TERM'`.
2. Create and format a new Stacking Database data component by running the IOADBF utility with the FUNC parameter set to EXTEND. Use the sample member CTTEMDB in the CTT..JCL library.
3. Restart Control-M/Tape using the operator command `S CTTINIT,PARM='MODE=INIT'`.

## Repository Backup and Recovery

Control-M/Tape has a comprehensive set of utilities that ensure data integrity and provide full recovery in situations caused by system or disk crashes or user error. Two types of recovery are possible: logical and physical. Each type is appropriate in specific situations. Use the following table to determine when to use each recovery method:

**Table 235 Comparison of Physical vs. Logical Recovery Methods**

|                            | Physical Recovery              | Logical Recovery                        |
|----------------------------|--------------------------------|-----------------------------------------|
| When to use:               | After a physical disaster      | After user errors                       |
| What is recovered:         | Entire Media Database          | Selected portions of the Media Database |
| How the data is recovered: | using restore and roll-forward | using rollback                          |

The following sections briefly discuss backup procedures, followed by a description of the procedures that the INCONTROL administrator must perform in various situations. For a detailed description of the utilities discussed in the following topics, see the *INCONTROL for z/OS Utilities Guide*.

## Media Database Backup

Control-M/Tape provides several utilities to facilitate the backup and recovery process. Backups can be performed at any time using batch utilities. At most sites, backups are initiated by the New Day procedure.

Normally, the Media Database is backed up first. It updates the Trace file with the date and time that backup started and completed. The Trace file is backed up as soon as the Media Database backup completes successfully. Therefore, each Media Database backup has a corresponding Trace file backup. All removable media processing can continue during this process.

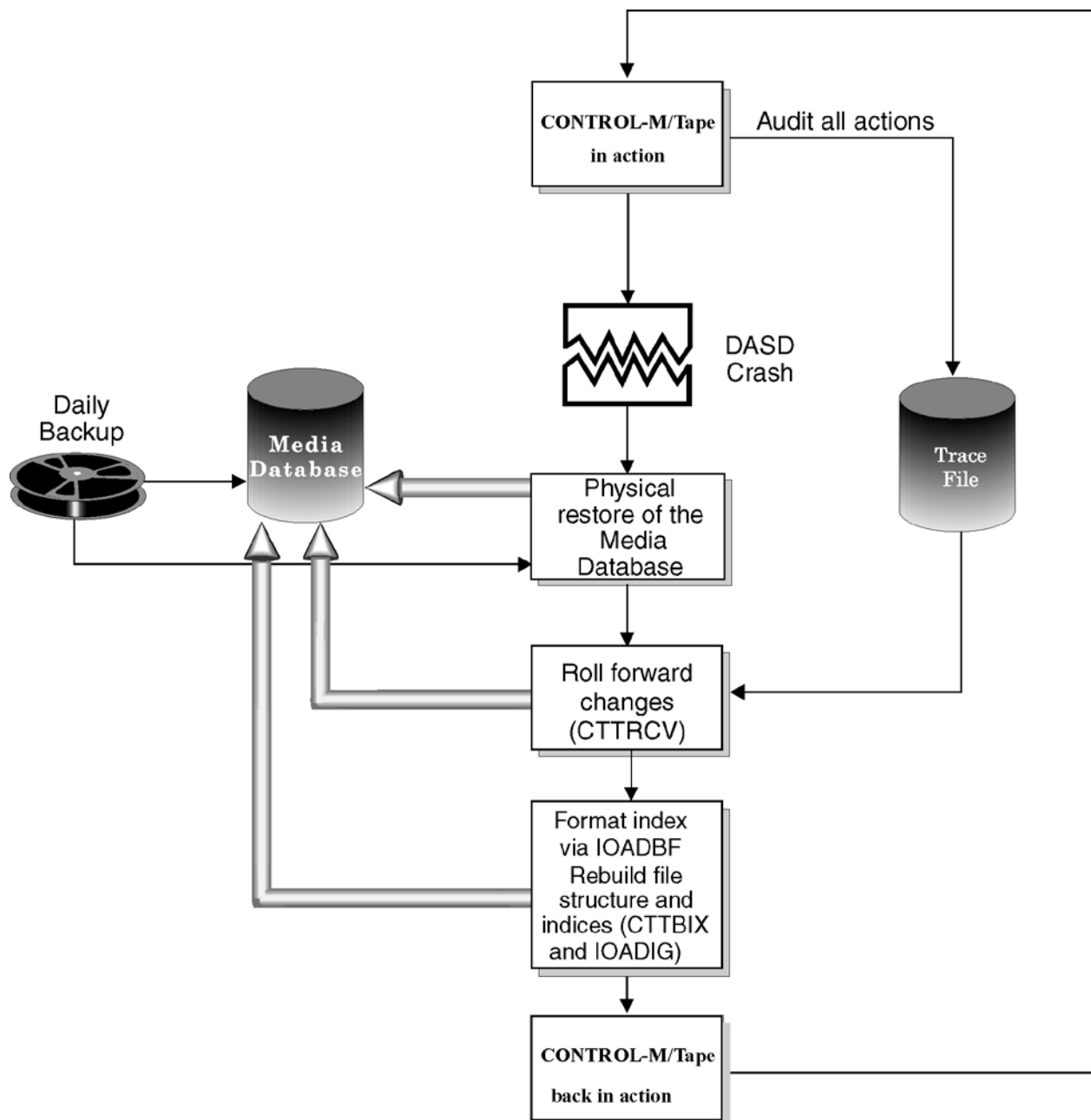
## Media Database Recovery

If the Media Database or some portion of it must be recovered as follows:

- Restore the latest Media Database backup using the standard site backup utility. Run the CTTRCV utility to apply all updates since that backup from the active Trace file (a Roll-Forward process).
- Based on the current Media Database, the CTTRcv utility can withdraw all updates until a certain point (a Rollback process). It can also remove all updates in a specified time range or generated by a specific job.
- When the restore is complete, the free record chain must be rebuilt by running the IOADIG utility with FUNC=W. All indexes must be rebuilt by running the CTTBIX utility.

## Disaster Recovery

Control-M/Tape recovery is performed using the most current Trace file and the last Media Database backup in three steps (see the following figure). First, a backup and restore utility (for example, ADDRSSU) is run to restore the Media Database. Then, the CTTRcv utility is run to roll forward all Trace file Updates since the last backup. The IOADIG and CTTBIX utilities are then run to rebuild the file structure and indexes.

**Figure 80 Disaster Recovery**

Run the IOADIG utility with the FUNC=W parameter and run the IOADB index format utility, before rebuilding the index file.

## Selective Recovery

This method recovers only a selection of changes that satisfy specified selection criteria. For example, to undo the effects of a bad maintenance job (such as a retention management job that ran with incorrect parameters) all decisions or actions made by this job must be reversed. Only selected portions of the Media Database are recovered. This is a logical, backward recovery using the CTTRCV, IOADIG, and CTTBIX utilities.

After completing the rollback updates, run utility IAODBF to format the index and then run the CTTBIX utility to rebuild the index file.

## Displaying Media Database Information on an OS/390 or z/OS Console

Information obtained from the Media Database volume and dataset records can be displayed on an OS/390 or z/OS console when the Inquiry and Update screen (option TI on the IOA Primary Option menu) is not readily available through other environments (such as TSO/E or the IOA online monitor). This display is designed for operations personnel, for whom the console is often more readily available than a TSO/E session. For more information on the Inquiry and Update facility, see the online facilities chapter in the *Control-M/Tape User Guide*.

## Defining Views

Media Database information is displayed on an OS/390 or z/OS console in a format called a "view," using one of three display commands. For more information on the display commands, see the *Control-M/Tape User Guide*. The types of views displayed are similar to the display types available through the Inquiry and Update facility. The view definitions reside in member VIEWSDEF in the Control-M/Tape PARM library.

There is a default view for each of the three Media Database display commands. For more information, see [Setting Default Views](#) (on page 656). The INCONTROL administrator can modify these default views, as well as define and modify optional views. A default view member is provided upon installation of Control-M/Tape.

The syntax for view definition is as follows:

```
viewtype fieldname, fieldname, ..., NAME=viewname
```

where

- *viewtype* is the type of view being defined (for example, a dataset view must display dataset-related fields, and a volume view must display volume-related fields). Valid values are
  - VOLVIEW: The view displays volume-related and volume group-related fields.
  - DSVIEW: The view displays dataset-related fields.

- *fieldname* is any field that must be displayed in the view. Any number of field names can be specified, separated by commas. For a list of Control-M/Tape Media Database field names, see [D Logical Field Names for the Control-M/Tape Repository](#) (on page 789).
- *viewname* is a user-defined name assigned to the view.

Examples of defining views:

```
VOLVIEW VOLSER ,VOLFLAGS , VAULTS ,NAME=V
```

```
VOLVIEW VOLSER ,VOLSTAT ,NAME=S
```

```
VOLVIEW VOLSEQ ,NEXTVOL , FIRSTVOL ,PREVVOL ,NAME=G
```

```
DSVIEW DSNAME ,DSVOLSER ,VOLSNUM ,NAME=D
```

The views are loaded when Control-M/Tape is initialized.

## Setting Default Views

To set the default views for each view type, add the following parameters in the View section of member CTT Parm in the IOA Parm library:

**Table 236 Parameters for Setting Default Views**

| Parameter         | Description                          |
|-------------------|--------------------------------------|
| DEFVVIEW=defvview | Default view name for volumes.       |
| DEFDVIEW=defgview | Default view name for volume groups. |
| DEFDVIEW=defdview | Default view name for datasets.      |

## Loading Views

The INCONTROL administrator can modify the default views for the display commands, as well as define and modify optional views. Samples of the default views are provided with Control-M/Tape, which can be used as provided, or modified as needed.

All views are loaded when Control-M/Tape is first initialized. Views can also be loaded after Control-M/Tape has been initialized, by issuing the following command at the console:

```
S CTTINIT , PARM= ' RELOAD , TBLT=VIEW '
```

Modifications to views only take effect after Control-M/Tape has been reinitialized or after the above command has been issued.



## Control-M/Restart Support for Control-M/Tape

The CTRX001 exit (Control-M/Restart Exit 1) is used by Control-R to release tapes which were used by the previous run of the job before the job is restarted.

The exit recognizes the appropriate Control-M/Tape it is working with to support the C-1 concept. The exit interfaces with Control-M/Tape using CTTAPI.

CTRX001 checks the compatibility mode values in IOAPARM for Control-M/Tape and Control-M/Restart and sets the SSNAME parameter in the CTTAPI call accordingly to one of the following:

- If MODECTR=MODECTT then SSNAME=blank.
- If MODECTR<MODECTT then SSNAME=ABOV.
- If MODECTR>MODECTT then SSNAME=BELW.

CTRX001 (Control-M/Restart Exit 1) must be defined as an interface between Control-M/Restart and Control-M/Tape. This exit must be defined in addition to (not as a replacement for) any previously defined Control-M/Restart Exit 1 (for example, an interface between Control-M/Restart and another product such as HSM or CA-1).

The Control-M/Restart Driver exit is used to invoke the Control-M/Tape Interface Exit 1 and any previously defined instances of Exit 1.

When Control-M/Restart Exit 1 is used for the Control-M/Tape interface, it receives dataset DELETE requests and changes the Control-M/Tape controlled dataset status to Scratch. This enables expiration of the specified dataset by the next run of Retention Management the CTTRTM utility. Using customization of this exit, you can cause Control-M/Tape controlled datasets to be scratched immediately (that is, without running the CTTRTM utility).

## Control-M/Restart Driver Exit CTRX001G

The Control-M/Restart Driver exit optionally invokes multiple user exits that provide programming interfaces to various dataset management software packages (for example, HSM or Control-M/Tape). The Control-M/Restart Driver exit sequentially invokes all user exits listed in its source text. Any number of single purpose Control-M/Restart user exits can be listed. For more information, see [Exits](#) (on page 745).

## Installing the Control-M/Restart Interface

Perform the following steps to install the Control-M/Restart to Control-M/Tape interface:

1. Verify that YES is specified for Control-M/Restart installation parameter TAPEMS in member CTRPARM in the IOA PARM library.
2. To compile and link Control-M/Restart Roof Exit CTRX001G and existing Control-M/Restart Exit CTRX001T, use the ICE Automatic Exit Installation tool. For details, see [Exits](#) (on page 745).
3. The ICE Automatic Exit Installation Tool Builds Job UMRX001G in the CUSTEXIT library. Using the Automatic Exit Installation tool, run the job.

For more information about the logic implemented by this exit, see the exit source.

## Control-M/Tape Application Programming Interface

The Control-M/Tape Application Programming Interface provides an interface between Control-M/Tape and user application programs. Control-M/Tape API requests are performed using Assemblers.

### Control-M/Tape API

The purpose of the Control-M/Tape API is to provide external products an access to the Control-M/Tape Media database. The API provides query commands to obtain information from the Media database, as well as logical updates commands such as scratch a volume or extend a volume.

When the API interface is invoked, it returns information about volumes and their datasets, as they are in the Control-M/Tape Media database. The output of the API is in a fixed format, and the information may contain both data set and volume information.

### Operations

The Control-M/Tape API has the following commands:

1. Initialize the API environment.
2. Close the API environment.
3. Start query for all volumes in the Media database.
4. Get the next record, which found by the last query command.
5. Change a volume or a data-set into scratch.
6. Change the expiration of volume or data set.

### Invoking the Control-M/Tape API

The access to the Control-M/Tape API is performed using the CTTAPI macro. The format of the CTTAPI is:

|       |        |                                                                                                                                                                                                                                                                            |
|-------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Label | CTTAPI | functi on- code,<br>RC=rc<br>REASON=reason,<br>URC=uti lity- rc,<br>REPLY=output- bl ock- addr,<br>REALENV=Y/N,<br>SCRATCH=Y/N,<br>OPTI ONS=opti ons,<br>OPENUPD=Y/N,<br>PATH=path,<br>WHERE=where,<br>TRACEVL=trc- l evel ,<br>MF=E/L<br>SSNAME=bl ank/<ssname>/ABOV/BELW |
|-------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Table 237 CTTAPI Macro Parameters**

| Parameter     | Description                                                                                                                                                                                                                                                                                                                                                                        |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function-code | <p>Specifies a function requested from CTTAPI. Mandatory. This parameter must always be the first parameter. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ START</li> <li>▪ END</li> <li>▪ QUERY and QUERYNEXT</li> <li>▪ VOLSRC</li> <li>▪ VOLACT</li> <li>▪ DSNSCR</li> <li>▪ DSNACT</li> </ul> <p>See next table, CTTAPI Function Values for more details.</p> |
| RC            | Specifies the return code returned to the caller. This variable must point to an area of two bytes (one half word). Identical to register R15.                                                                                                                                                                                                                                     |
| REASON        | Specifies the reason code returned to the caller. This variable must point to an area of two bytes (one half word).                                                                                                                                                                                                                                                                |
| URC           | Specifies utility return code, which is returned to CTTAPI from the invoked utility if that utility failed.                                                                                                                                                                                                                                                                        |
| REPLY         | <p>Start address of the reply buffer:</p> <ul style="list-style-type: none"> <li>▪ If set to zero, no reply is returned.</li> <li>▪ If set to a value other than zero, the API return its replies into this buffer.</li> </ul> <p>This parameter is mandatory for QUERY and QUERYNEXT. The reply buffer is mapped according to DSECT CTTOAPI.</p>                                  |
| SCRATCH       | <p>Specifies if the output data includes SCRATCH volumes or not. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y Include SCRATCH volumes. Default.</li> <li>▪ N Do not include SCRATCH volumes</li> </ul> <p>This parameter can be specified just for function code QUERY.</p>                                                                                    |

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WHERE     | <p>This parameter must be specified when using QUERY, VOLSRC, VOLACT, DSNSCR, and DSNACT functions.</p> <p>Defines requested selection criteria (like the WHERE clause in SQL). The format of this input field is the same as the INCLUDE/EXCLUDE statements, which are used in the CTTRPT report utility. When using this parameter, all fields are available to the selection criteria. The area begins with a half-word counter of a number of lines, proceeded by the required number of lines, each in a field of 80 bytes.</p> |
| PATH      | <p>This parameter can be specified only when using the QUERY function.</p> <p>Controls the output record from the API. The field can hold one of the values listed in <i>Control-M/Tape Control Table (TCT)</i> (on page 667).</p>                                                                                                                                                                                                                                                                                                   |
| OPTIONS   | <p>This parameter must be specified when using VOLSRC, VOLACT, DSNSCR, and DSNACT functions. The syntax of this parameter is:</p> <p>For VOLSRC:</p> <p>DSNSCR - {DEFERRED   IMMEDIATE}</p> <p>If DEFERRED is specified, the volume takes the status of PENDING SCRATCH and is the default value for this function.</p> <p>For VOLACT:</p> <p>DSNACT - RETENTION={EDM   &lt;number of days&gt;}</p> <p>The default value for this function is 0 days.</p>                                                                            |
| OPENUPD   | <p>Must be set to Y (to open the database for updating) with VOLSRC, VOLACT, DSNSCR, or DSNACT functions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                        |
| REALENV   | <p>This parameter can be specified only for the START function.</p> <p>Specifies whether to use the real-time environment or to build a new environment. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y Use the real-time environment. It is valid as long as Control-M/Tape is active. Default.</li> <li>▪ N Load a new Control-M/Tape environment.</li> </ul>                                                                                                                                                    |

| Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TRACELVL  | Specifies which Control-M/Tape trace level to turn on.<br><br>This variable must point to an area one byte in length. Valid values are according to Control-M/Tape trace level values. In order to turn off the trace level, the area should contain 0. This parameter can be specified only for the START function, which loads the environment, and is applicable when REALENV=N.                                                                                                                                                                                                                                                                                                                                                                       |
| MF        | Specifies the form of the macro. Valid values are: <ul style="list-style-type: none"> <li>▪ E Execute form</li> <li>▪ L List form</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| SSNAME    | This parameter can be specified only when using the START function. This parameter is relevant only if the real-time environment is accessed (REALENV=Y).<br><br>Specifies the Control-M/Tape. Optional. Valid values are: <ul style="list-style-type: none"> <li>▪ blank<br/>Use the Control-M tape associated with the API subsystem (same as not specifying this parameter.) Default.</li> <li>▪ &lt;ssname&gt;<br/>Use the Control-M/Tape associated with the subsystem name specified.</li> <li>▪ ABOV<br/>Use one step up from the current subsystem name of the API (use the next Control-M/Tape release).</li> <li>▪ BELW<br/>Use one step down from the current subsystem name of the API (use the preceding Control-M/Tape release).</li> </ul> |

**Table 238 CTTAPI Function Values**

| Parameter | Description                                                                                                    |
|-----------|----------------------------------------------------------------------------------------------------------------|
| START     | Initialize the API environment.                                                                                |
| END       | Close the API environment                                                                                      |
| QUERY     | Start query based on selection criteria specified in the WHERE parameter from the Media database               |
| QUERYNEXT | Get the next record query based on selection criteria specified in the WHERE parameter from the Media database |

| Parameter | Description                                                                                                                                                  |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VOLSCR    | Scratch a volume based on a request specified in the OPTION parameter. The volumes to be scratched are specified in the WHERE parameter.                     |
| VOLACT    | Change the expiration of volume based on a request specified in the OPTION parameter. The volumes to be modified are specified in the WHERE parameter.       |
| DSNSCR    | Scratch a data set based on a request specified in the OPTION parameter. The data sets to be scratched are specified in the WHERE parameter.                 |
| DSNACT    | Change the expiration of a data set based on a request specified in the OPTION parameter. The data sets to be modified are specified in the WHERE parameter. |

**Table 239 CTTAPI Path Values**

| Path    | Record Description                                                                                                                                                                                                                            |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALL     | Used only by a Resolve SRM for Tape project. The entire Media database is read sequentially. One output record is returned for each data set of each volume.<br><br>This was developed in the first phase of the API.                         |
| DS      | The program read data set records using the data set index. One output record is returned for each dataset record in the Media database. The volume information is not filled in the output record.                                           |
| DS/FVOL | The program reads data set records using the data set index. One output record is returned for each data set record in the Media database. The output record holds the data set information along with the first volume of the data set.      |
| DS/AVOL | The program reads data set records using the data set index. One output record is returned for each data set of each volume. The output record holds the data set information along with the volume information.                              |
| VOL     | The program reads volume records using the volume index. One output record is returned for each volume record in the Media database. The data set information is not filled in the output record.                                             |
| VOL/FDS | The program reads volume records using the volume index. One output record is returned for each volume record in the Media database. The output record holds the volume information along with the first data set that resides on the volume. |

| Path    | Record Description                                                                                                                                                                                                                    |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VOL/ADS | The program reads volume records using the volume index. One output record is returned for each volume and a data set that resides on the volume. The output record holds the volume information along with the data set information. |

## Return Codes

One of the following return codes is returned to the user in general register 15:

**Table 240 CTTAPI Return Codes**

| Code | Description                                                                           |
|------|---------------------------------------------------------------------------------------|
| 0    | Command completed successfully.                                                       |
| 4    | End of information if the command is QUERY or QUERYNEXT.                              |
| 8    | The operation could not be performed. The command process encountered a severe error. |
| 12   | Syntax error.                                                                         |
| 16   | Severe error in CTTAPI.                                                               |

## Reason Codes

The list of the reason codes, their related return codes, and the source of the ABEND are listed below:

**Table 241 CTTAPI Reason Codes**

| RC | Reason Code | Variable            | Description                                             | RC from Routine |
|----|-------------|---------------------|---------------------------------------------------------|-----------------|
| 8  | 200         | TAPI_NOHANDLER      | No handler was set to CTTAPI                            |                 |
|    | 204         | TAPI_GETMAIN_ERROR  | GETMAIN failed                                          | GETMAIN         |
|    | 208         | TAPI_NOACTIVE_QUERY | QERYNEXT was requested without requesting QUERY earlier |                 |
|    | 212         | TAPI_INVALIDCALL    | Invalid call to CTTAPI. Maybe not using macro CTTAPI    |                 |
|    | 216         | TAPI_NOBUFFER       | No buffer was sent in QUERY or QUERYNEXT requests       |                 |
|    | 220         | TAPI_SUBTASK_ERR    | Attach error                                            | ATTACH          |

| RC | Reason Code | Variable                 | Description                                                     | RC from Routine |
|----|-------------|--------------------------|-----------------------------------------------------------------|-----------------|
|    | 224         | TAPI_OPEN_ERROR          | Open Control-M/Tape database failed                             | CTTIOS          |
|    | 228         | TAPI_CLOSE_ERROR         | Close Control-M/Tape database failed                            | CTTIOS          |
|    | 232         | TAPI_LOADENV_ERR         | Load environment error                                          | CTTTLD          |
|    | 236         | TAPI_NO_ACTIVE_TCT       | Control-M/Tape is not active when requesting Online environment | CTTGCT          |
|    | 240         | TAPI_ALCDB_ERROR         | Allocation database error                                       | IOALLOC         |
|    | 244         | TAPI_FREEDB_ERROR        | Error during database free                                      | IOALLOC         |
|    | 248         | TAPI_USER_NOTAUTHORIZE D | User not authorized                                             |                 |
|    | 252         | TAPI_SCR_ACT_EXMERR      | Expiration management error (CTTEXM)                            |                 |
|    | 256         | TAPI_SCR_ACT_NOUPD       | MDB was opened not in Update mode                               |                 |
|    | 260         | TAPI_NOT_APF_AUTHORIZED  | PROGRAM IS NOT APF AUTHORIZED                                   |                 |
| 12 | 200         | TAPI_INVALID_FUNCTION    | Function is not supported                                       |                 |
|    | 204         | TAPI_INVALID_PATH        | Path is invalid                                                 |                 |
|    | 208         | TAPI_INVALID_REL         | Relation is invalid                                             |                 |
|    | 212         | TAPI_INCONS_REL          | Relation is inconsistent                                        |                 |
|    | 216         | TAPI_MASK_ERROR          | Mask is invalid                                                 |                 |
|    | 220         | TAPI_PARS_ERROR          | Parsing error                                                   |                 |
|    | 224         | TAPI_INC_EXCL_ERROR      | Combination of WHERE and PATH is invalid                        |                 |
|    | 228         | TAPI_INCP_ERROR          | Include/Exclude error                                           |                 |
|    | 232         | TAPI_OPTIONS_ERROR       | Invalid options                                                 |                 |
|    | 236         | TAPI_VOLACTION_ERROR     | Volume does not exist                                           |                 |
|    | 240         | TAPI_DSNACTION_ERR_1     | Data set does not exist (DSVOLSER+DSLABEL)                      |                 |



| RC | Reason Code | Variable                  | Description                           | RC from Routine |
|----|-------------|---------------------------|---------------------------------------|-----------------|
|    | 244         | TAPI_DSNACTION_ERR_2      | Requested DSName is not equal to real |                 |
|    | 248         | TAPI_VOLSRC_DENIED        | Environment inconsistent with request |                 |
| 16 | 200         | TAPI_DYNALLOC_ERROR       | Dynamic allocation error              | SVC99           |
|    | 204         | TAPI_DYNFREE_ERROR        | Dynamic free error                    | SVC99           |
|    | 208         | TAPI_READ_ERROR           | Read error from database (CTTIOS)     |                 |
|    | 212         | TAPI_SORT_ERROR           | Sort error                            | SORT            |
|    | 216         | TAPI_MORE_THAN_2_PARALLEL | More than 2 API parallel              |                 |

## Output Record Format

The output record from the QUERY command is in a fixed format, regardless of the version of Control-M/Tape. The output record holds both data set and volume information. DSECT CTTOAPI maps the output record.

## Sample Usage

```
*****00000100*****
*
* CTTAPIEX
*
* FUNCTION: SAMPLE PROGRAM TO DEMONSTRATE ACCESS TO THE Control-T
*           MEDIA DATA BASE (MDB) USING THE CTT API.
*
* OUTPUT:   THE SAMPLE PRODUCES A REPORT OF ALL THE ACTIVE VOLUMES
*           AND ITS DATASETS. THE DATASETS ORDER IN THE REPORT IS
*           ACCORDING TO THE DATASETS LABEL IN THE CHAIN.
*
* LOGIC:    AT FIRST, THE PROGRAM STARTS THE API. THEN IT PERFORMS
*           QUERY ON THE DATABASE AND RECEIVES THE FIRST RECORD.
*           AFTERWARD IT PERFORMS QUERYNTX FOR EACH RECORD UNTIL
*           IT RECEIVES RC=4. AT THE END, THE PROGRAM CLOSES THE
*           API.
*
* TO COMPILE, LINK AND RUN THE PROGRAM
*
//CTTAPIEX JOB . .
//ASM EXEC CTTASM
//C.SYSIN DD DISP=SHR,DSN=IOA.SAMPLE(CTTAPIEX) <<<---- CHANGE
//L.AIOALOAD DD DISP=SHR,DSN=IOA.AIOALOAD <<<---- CHANGE
//L.SYSLMOD DD DISP=SHR,DSN=YOUR.LOAD.LIBRARY <<<---- CHANGE
//L.SYSIN DD *
MODE RMODE(24),AMODE(31)
ENTRY CTTAPIEX
NAME CTTAPIEX(R)
/*
//
//RUN EXEC PGM=CTTAPIEX,COND=(0,NE),REGION=60M
//STEPLIB DD DISP=SHR,DSN=YOUR.LOAD.LIBRARY <<<---- CHANGE
// DD DISP=SHR,DSN=IOA.LOAD <<<---- CHANGE
//DAALOCIN DD DISP=SHR,DSN=IOA.PARM(ALCCCTT) <<<---- CHANGE
//DARPTOUT DD SYSOUT=*
//
*****
-----V. 9. 0. 00-----
** WT0761 18.08.02 CTT API -YM*
*****
MACRO
00000200
00000300
00000400
00000500
00000600
00000700
00000800
00000900
00001000
00001100
00001200
00001300
00001400
00001500
00001600
00001700
00001800
00001900
00002000
00002100
00002200
00002500
00002600
00002700
00002800
00002900
00003000
00003100
00003200
00003300
00003400
00003500
00003600
00003700
00004200
00004400
00004500
00004600
00004700
00004800
00004900
00005000
```

# INCONTROL for z/OS Administrator Guide

```

&NAME      MYPUT &DCB,&REC      00005100
&NAME      LA      R15,*+6      ADDRESS FOLLOWING BASSM      00005200
          BASSM      R14,R15      CHANGE AMODE      00005300
          PUT      &DCB,&REC      PUT THE DESIRED RECORD      00005400
          LA      R15,*+10      ENDING ADDRESS      00005500
          0      R15,=X'80000000'      00005600
          BSM      0,R15      00005700
          MEND      00005800
          CTTIAPI      INPUT DSECT PARAMETERS      00005900
          CTTOAPI      OUTPUT DSECT PARAMETERS      00006000
CTTAPEX     CSECT      00006100
CTTAPEX     AMODE 31      00006200
CTTAPEX     RMODE 24      00006300
          BEGIN      EQU=YES      00006400
          OPEN      (RPTOUT,OUTPUT)      OPEN VOLUME REPORT OUTPUT FILE      00006600
          LTR      R15,R15      SUCCESSFUL ?      00006700
          BNZ      OUTERROR      NO - TERMINATE      00006800
          MYPUT      RPTOUT,HEADER1      PRINT REPORT HEADER      00006900
          MYPUT      RPTOUT,HEADER2      PRINT REPORT HEADER      00007000
*      00007100
* START THE API ENVIRONMENT.      00007200
* THE RELEVANT PARAMETERS FOR START ARE AS THE FOLLOWING:      00007300
* 1) FUNCTION START      00007400
* 2) RC WHICH IS ALSO PROVIDED IN R15      00007500
* 3) REASON      00007600
* 4) UTILITY RC WHICH CONTAINS THE RC THAT RETURNED FROM THE      00007700
* THE CALLED PROGRAM.      00007800
* 5) REALENV=(Y/N) - SPECIFY IF API WILL USE THE Control-T      00007900
* REAL ENVIRONMENT INSTEAD OF OPENING THE MEDIA DATABASE FILES.      00008000
* DEFAULT: N - ALLOCATE AND OPEN THE MEDIA DATABASE FILES.      00008100
*      00008200
          CTTAPI      START,RC=RC,REASON=REASON,MF=(E,APILIST)      00008400
          LTR      R15,R15      WAS START SUCCESSFUL?      00008500
          BZ      DOQUERY      00008600
          B      RETURN      00008700
*      00008800
* PERFORM QUERY REQUEST.      00008900
* THE RELEVANT PARAMETERS ARE AS THE FOLLOWING:      00009000
* 1) FUNCTION=QUERY      00009100
* 2) RC IF REQUIRED. IT IS ALSO RETURN IN R15.      00009200
* 3) REASON      00009300
* 4) URC - UTILITY RC FROM CALLED PROGRAM.      00009400
* 5) REPLY - REPLY BUFFER ADDRESS IN CTTOAPI FORMAT.      00009500
* 6) PATH - SPECIFIES THE TYPE OF RECORDS TO BE EXTRACTED.      00009600
* VALID VALUES:      00009700
* VOL - VOLUME RECORDS ARE EXTRACTED      00009800
* VOL/FDS - VOLUME RECORDS WITH ONLY THEIR      00009900
* FIRST DATASET RECORDS ARE EXTRACTED.      00010000
* VOL/ADS - VOLUME RECORDS WITH ALL THEIR      00010100
* DATASET RECORDS ARE EXTRACTED, DEFAULT.      00010200
* DS - DATASET RECORDS ARE EXTRACTED.      00010300
* DS/FVOL - DATASET RECORDS WITH ONLY THEIR      00010400
* FIRST VOLUME RECORD ARE EXTRACTED.      00010500
* DS/AVOL - DATASET RECORDS WITH ALL THEIR      00010600
* VOLUME RECORDS ARE EXTRACTED.      00010700
* 7) WHERE - SPECIFY INCLUDE AND EXCLUDE STATEMENTS LIKE IN OTHERS      00010800
* Control-T UTILITIES.      00010900
*      00011000
DOQUERY     EQU      *      00011100
          CTTAPI      QUERY,REPLY=BUFREP,RC=RC,REASON=REASON,URC=URC,      00011200
          PATH=PATH,WHERE=WHERE,MF=(E,APILIST)      *00012500
          LTR      R15,R15      00012600
          BZ      LOOPNEXT      00012700
          B      RETURN      00012800
*      00012900
* PERFORM QUERYNEXT - GET THE NEXT RECORD      00013000
* THE RELEVANT PARAMETERS FOR THE QUERYNEXT ARE AS THE FOLLOWING:      00013100
* 1) FUNCTION QUERYNEXT      00013200
* 2) REPLY = REPLY BUFFER ADDRESS FORMATTED AS CTTOAPI      00013300
* 3) RC      00013400
* 4) REASON      00013500
* 5) URC      00013600
*      00013700
LOOPNEXT     EQU      *      00013800
          L      R8,BUFREP      GET BUFFER ADDRESS      00013900
          USING      CTTO,R8      00014000
          MVC      PRINTREC(L'CTTVOLSR),CTTVOLSR      00014100
          MVC      PRINTREC+8(L'CTTDDSN),CTTDDSN      00014200
          MYPUT      RPTOUT,PRINTREC      00014300
*      00014400
          CTTAPI      QUERYNEXT,REPLY=BUFREP,RC=RC,REASON=REASON,URC=URC,      *00014600
          MF=(E,APILIST)      00014700
          LTR      R15,R15      00014800
          BZ      LOOPNEXT      00014900
          C      R15,=F'4'      DID WE FINISH QUERY?      00015000
          BE      GOEND      00015100
          B      RETURN      00015200
*      00015300
* PERFORM END - DELETE THE API ENVIRONMENT.      00015400
* THE RELEVANT PARAMETERS FOR THE END ARE AS THE FOLLOWING:      00015500
* 1) FUNCTION END      00015600
* 2) RC      00015700
* 3) REASON      00015800
* 4) URC - UTILITY RC      00015900
*      00016000
GOEND        EQU      *      00016100
          CTTAPI      END,REASON=REASON,MF=(E,APILIST)      00016200
          CLOSE      (RPTOUT)      00016300
          B      RETURN      00016400
OUTERROR     WTO      'UNABLE TO OPEN OUTPUT FILE'      00016500
          LA      R15,8      00016600
RETURN        EQU      *      00016700
          BRTRN      (15)      00016800
          00039200

```

|                |        |                                                            |           |
|----------------|--------|------------------------------------------------------------|-----------|
| APILIST        | CTTAPI | MF=L                                                       | 00039300  |
| BUFREP         | DC     | A(0)                                                       | 00039400  |
| RC             | DS     | H                                                          | 00039600  |
| REASON         | DS     | H                                                          | 00039800  |
| URC            | DS     | H                                                          | 00039900  |
| TRCLVL         | DC     | X' 10'                                                     | 00040000  |
| RPLBUF         | DS     | (CTTOLEN) X                                                | 00040100  |
| PATH           | DC     | CL8' VOL/ADS'                                              | 00040200  |
| WHERE          | DC     | H' 1'                                                      | 00040300  |
| HEADER1        | DC     | CL80' INCLUDE VOLSTAT=ACTIVE'                              | 00040400  |
| HEADER2        | DC     | CL80' VOLUME DATASET'                                      | 00040500  |
| PRINTREC       | DC     | CL80' -----'                                               | 00040600  |
| ***            |        |                                                            | 00040700  |
| * DATA Control | BLOCKS |                                                            | 00040800  |
| ***            |        |                                                            | 00040900  |
| RPTOUT         | DCB    | DDNAME=DARPTOUT, MACRF=PM, LRECL=80, RECFM=FB,<br>DSORG=PS | *00041100 |
|                |        |                                                            | 00042000  |
| END            |        |                                                            | 00110000  |

## Legacy APIs

### Background Information

Users must become familiar with the following background information before using the Control-M/Tape Application Programming Interface.

#### Control-M/Tape Control Table (TCT)

Control-M/Tape stores certain basic information (for example, the values specified for Control-M/Tape installation parameters) in a control block called the Control-M/Tape Control Table (TCT). User-written APIs require access to the TCT in order to determine certain aspects of the Control-M/Tape environment.

The TCT is mapped by macro CTTTCT.

Note: The TCT, and all other major Control-M/Tape control blocks, are allocated above the 16MB line. Therefore, all programs using the Control-M/Tape API must run in extended addressing mode (AMODE 31).

The following table describes two types of TCTs that are used by Control-M/Tape APIs:

**Table 242 Types of TCTs Used by Control-M/Tape APIs**

| Type      | Description                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local TCT | <p>A control block containing the values specified for Control-M/Tape installation parameters. A local TCT is used by base level APIs. Programs that use the Base level API call a Control-M/Tape routine that creates a local TCT for use by that API. A local TCT can be created regardless of whether Control-M/Tape is active.</p> <p>For more information about how to create a local TCT, see below.</p> |

| Type          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Real-Time TCT | <p>A control block containing information about the Control-M/Tape real-time environment. The Real-Time TCT contains all information that appears in a local TCT and, in addition, it contains information generated during Control-M/Tape initialization (for example, rule tables addresses and for user exits).</p> <p>The Real-Time TCT is used by the high level API and the Rule Search API. The high level API uses its own internal method to access the TCT. The Rule Search API requires the address of the Real-Time TCT. This address is obtained using the CTTGTCT macro. For more information, see <a href="#">Obtaining the Address of the Real-Time TCT</a> (on page 669).</p> <p>The Real-Time TCT is available only when Control-M/Tape is active. It is built by Control-M/Tape during initialization and is kept in E/CSA storage.</p> |

### Creating a Local TCT

A local TCT must be created for each program that uses the Base-Level API. This task is performed using routine CTTTLD that is called from a user-written program.

Use the following call to invoke routine CTTTLD:

```
CALL      CTTTLD,(func-addr, tct-addr, 0, 0)
```

where

- *func-addr* is the address of an 8-character field that describes the function to be performed by routine CTTTLD. Valid values are
  - LOADENV: Create a local TCT.
  - DELETE: Release the storage area used by the LOAD function call. Routine CTTTLD must be called with this function after the user-written program has finished using the base level API.
- *tct-addr* is the address of a full-word field in which the routine inserts the address of the newly created local TCT.

The job step used to run the CTTTLD routine must include a DD statement, DAPARM, that references the IOA PARM and IOA IOAENV libraries. If the IOA LOAD library is not part of the LINKLIST, add it using a STEPLIB DD statement.

## Return Codes

Routine CTTTLD returns one of the following return codes in general register 15:

**Table 243 Return Codes for Routine CTTTLD**

| Code | Description                    |
|------|--------------------------------|
| 0    | Local TCT created successfully |
| 4    | Invalid function               |
| 8    | TCT could not be created       |
| 12   | GETMAIN failed                 |

## Sample TCT Load Request

The following sample demonstrates a load request call to routine CTTTLD that creates a copy of the local TCT:

**Figure 81 Sample TCT Load Request**

|         |                                  |                                        |  |                     |
|---------|----------------------------------|----------------------------------------|--|---------------------|
| CALL    | CTTTLD, (LOADENV, TCTADDR, 0, 0) |                                        |  | Load the TCT        |
| LTR     | R15, R15                         |                                        |  | Successful ?        |
| BNZ     | TCTFAIL                          |                                        |  | No - Terminate      |
| L       | R12, TCTADDR                     |                                        |  |                     |
| USING   | TCT, R12                         |                                        |  |                     |
| .       |                                  |                                        |  |                     |
| .       |                                  |                                        |  |                     |
| TCTFAIL | WTO                              | ' TCT LOAD FAILED, PROGRAM TERMINATED' |  |                     |
| .       |                                  |                                        |  |                     |
| LOADENV | DC                               | CL8' LOADENV'                          |  | Constant for CTTTLD |
| TCTADDR | DS                               | A                                      |  | Address of TCT      |
| .       |                                  |                                        |  |                     |
| TCT     | DSECT                            |                                        |  |                     |
|         | COPY                             | CTTTCT                                 |  | TCT mapping         |

## Obtaining the Address of the Real-Time TCT

Each invocation of a Rule Search API must include the address of the Real-Time TCT. The address of the Real-Time TCT is obtained using macro CTTGTCT.

Use the following call statement to invoke macro CTTGTCT:

```
CTTGTCT      TCTADDR=tctaddr, TEST=ACT
```

where

- *tct-addr* is the address of a full-word field to contain the address of the Real-Time TCT that is returned by macro CTTGTCT. Optional. If no value is specified for this parameter, the address of the Real-Time TCT is returned in general register 1.
- TEST is an explicit request to check if Control-M/Tape is active. A value of ACT must be specified for this parameter.

Macro CTTGTCT alters the values in general registers 0, 1, and 15. If programs at your site depend on the integrity of values in these registers, it is recommended that you save their values before running macro CTTGTCT and restore them after the macro is completed.

### Return Codes

The CTTGTCT macro returns one of the following return codes in general register 15:

**Table 244 Return Codes for Macro CTTGTCT**

| Code  | Description                                  |
|-------|----------------------------------------------|
| 0     | Real-Time TCT address successfully obtained. |
| 4     | Control-M/Tape is not active.                |
| other | TCT address could not be determined.         |

### Sample TCT Address Request

The following sample demonstrates how macro CTTGTCT is called to obtain the address of the Real-Time TCT:

**Figure 82 Sample TCT Address Request**

|         |          |                                                    |                       |
|---------|----------|----------------------------------------------------|-----------------------|
|         | CTTGTCT  | TCTADDR=ACTVTCT, TEST=ACT                          |                       |
|         | LTR      | R15, R15                                           | Active TCT obtained ? |
|         | BNZ      | TCTFAIL                                            | No - Terminate        |
|         | L        | R12, ACTVTCT                                       |                       |
|         | USING    | TCT, R12                                           |                       |
| .       |          |                                                    |                       |
| TCTFAIL | WTO      | ' TCT NOT FOUND OR NOT ACTIVE, PROGRAM TERMINATED' |                       |
| .       |          |                                                    |                       |
| CVT     | COPY     | CTTSSVT                                            | For use by            |
|         | CVT      | DSECT=YES, PREFIX=YES                              | Macro                 |
|         | IEFJSCVT |                                                    | CTTGTCT               |
|         | IEFJESCT |                                                    |                       |
| ACTVTCT | DS       | A                                                  | Address of TCT        |
| .       |          |                                                    |                       |
| TCT     | DSECT    |                                                    |                       |
|         | COPY     | CTTTCT                                             | TCT mapping           |

## Control-M/Tape Media Database

The API consists of Assembler macros that facilitate interaction with the Control-M/Tape Media Database. Therefore, familiarity with the Media Database format is a prerequisite for using the API. For a detailed description of the Media Database see [Media Database Structure](#) (on page 637).

## Base Level versus High Level API

A calling program can interface with Control-M/Tape using either the base level or high level API (Application Programming Interface). The base level API offers versatility with few fixed requirements. The high level API provides more automation but requires an active Control-M/Tape real-time environment and APF authorization. the following table details the differences between these two types of API access methods.

Note: The term "real-time environment" as used in this chapter refers to the Control-M/Tape environment initialized by the following operator command: S CTTINIT,PARM='MODE=INIT'

**Table 245 API Access Method Functions**

| Function                                        | Base Level API                                                                                       | High Level API                                                                                                                                                                          |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Available Functions                             | Reads any Media Database record.                                                                     | Performs Read, Update, Add, or Delete functions on volume records only.                                                                                                                 |
| Sequential Read                                 | Supported by the READNEXT function.                                                                  | Not supported.                                                                                                                                                                          |
| Authorization Required from the Calling Program | None.                                                                                                | APF authorization.                                                                                                                                                                      |
| Keyed and Non-keyed Access                      | Both keyed and non-keyed (RBA based) access is supported.                                            | Only keyed access supported.                                                                                                                                                            |
| Media Database Allocation                       | The calling program must allocate DAMDB, DAMDI and DATRC files.                                      | The calling program does not need to allocate Database components. The real-time environment Data file, Index file, and Trace file are allocated automatically for the calling program. |
| Load of Control-M/Tape Control Table (TCT)      | The calling program must load a Control-M/Tape Control Table (TCT).                                  | The calling program need not load a Control-M/Tape Control Table (TCT). The real-time environment TCT is accessed for the calling program.                                              |
| Control-M/Tape real-time environment            | Base level API can be used regardless of whether the Control-M/Tape real-time environment is active. | High level API can be used only if the Control-M/Tape Real- Time Environment is active.                                                                                                 |

## Base Level API

When accessing the Media Database, the base level API can perform the following functions:

**Table 246 Base Level API Functions**

| Function | Description                                                                                                                                   |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| OPEN     | Access of the Media Database must begin with a request to open the database.                                                                  |
| READ     | This request reads a record. This function is generally used for reading specific records.                                                    |
| READNEXT | Reads the records following the specified record, that is, the next records. This function is generally used for reading a series of records. |
| CLOSE    | Access of the Media Database must end with a request to close the database.                                                                   |

### Record Access by the Base Level API

Records in the database can be accessed by non-keyed or keyed methods.

- To perform non-keyed access of database records, the full RBA must be specified.
- To perform keyed access of database records, the value specified depends on the function performed.
  - To perform a READNEXT operation, the entire index record must be specified.
  - To perform a READ operation, it is sufficient to use a partial key. Of course, the full key or even the full index record can be used.

Both READ and READNEXT requests return the full index record to the area pointed to by the KEY parameter.

A READ request is usually used for accessing a specific record. Since a READ request can use a partial key as input, it is also useful when you have only partial data available (for example, a volser without a label number when using the L-type index).

A READNEXT request is usually used for accessing a series of records. Since, however, a READNEXT request requires specification of a full index value (whereas a READ request can use a partial key as an input value), a sequence of READNEXT requests must be preceded by a READ request.

### Macro CTTIOS

Control-M/Tape APIs use macro CTTIOS to access the Media Database. However, before the base level API can use macro CTTIOS, the Control-M/Tape Control Table (TCT) must be loaded.

Instructions for loading the TCT are included in the examples for base level API. For more information, see [Examples of Macro Access and Base Level API Functions](#) (on page 678).



**Format**

Instructions for macro CTTIOS are formatted as follows:

**Figure 83      Formats for Macro CTTIOS Instructions**

|       |        |                                                                                                                                                                                                                                                                                             |
|-------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Label | CTTIOS | request-type,<br>function-code,<br>RC=reason-code-field,<br>[ENV=environment-id,]<br>[TCT=tst-address,]<br>[LVL=debug-level,]<br>[REC=buffer-address,]<br>[RBA=field,]<br>[DATA=Y/N,]<br>[KEY=key-field,]<br>[KEYTYPE=key-type,]<br>[KEYLEN=key-length,]<br><br>[MF={L, (E, list-address)}] |
|-------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Note: The CTTIOS macro may contain other parameters and fields, but only the parameters described in this chapter must be used. Specifying other parameters can lead to unpredictable results, and these additional parameters may not be supported in future versions of Control-M/Tape.

**Parameters****Table 247      Base Level API Parameters**

| Parameter     | Description and Valid Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| request-type  | Type of request from the CTTIOS macro. Mandatory. This parameter must always be the first parameter in the macro instructions. Valid values are: <ul style="list-style-type: none"> <li>▪ VOL - Volume data requests.</li> <li>▪ DS - Dataset data requests.</li> <li>▪ ANY - Both volume and dataset data requests.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                              |
| function-code | Function requested from the CTTIOS macro. Mandatory. This parameter must always be the second parameter in the macro instructions. Valid values are: <ul style="list-style-type: none"> <li>▪ <a href="#">Base Level API Access of the Media Database</a> (on page 676)pen the Media Database (to establish access to the Media Database).</li> <li>▪ CLOSE - Close the Media Database (to terminate access to the Media Database).</li> <li>▪ READ - Read data from the Media Database.</li> <li>▪ READNEXT - Read the next data item from the Media Database.</li> </ul> <p>These functions are described in more detail in <a href="#">Base Level API Access of the Media Database</a> (on page 676).</p> |

| Parameter | Description and Valid Values                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RC        | <p>Points to a 4-byte area into which the CTTIOS macro places the reason code. Mandatory for all request types and function codes.</p> <p>Reason codes are extremely useful when analyzing the reasons a request failed, and must be kept for debugging and error handling purposes. For explanations of reason codes, see the CTT200S message in the <i>INCONTROL for z/OS Messages Manual</i>.</p> <p>Do not confuse the reason code with the return code located in register 15.</p> |
| ENV       | <p>Points to a four-byte field that identifies the environment under which the Media Database is opened. Mandatory for Media Database OPEN requests.</p> <p>The value specified in the ENV parameter is passed to user exits and is recorded in the Trace file when Media Database updates are performed.</p>                                                                                                                                                                           |
| TCT       | Address of the TCT returned by the CTTTLD macro. Mandatory for Media Database OPEN requests.                                                                                                                                                                                                                                                                                                                                                                                            |
| TRACELVL  | A 1-byte field that specifies the tracing level to be used for further executions of the CTTIOS macro. Mandatory for Media Database OPEN requests. It must contain value X'00'.                                                                                                                                                                                                                                                                                                         |
| REC       | The buffer into which the CTTIOS macro puts data retrieved from the Media Database. Mandatory for READ requests. REC must point to an area large enough to hold the data record retrieved from the database.                                                                                                                                                                                                                                                                            |
| RBA       | <p>Record location identifier, used to determine which record must be retrieved from the Data file.</p> <p>For READ requests, this field must specify the RBA of the record to be read (or X'000100' for the first record). For READNEXT requests, the field must specify the RBA of the record preceding the record to be read (that is, the RBA returned by the previous READ/READNEXT request).</p>                                                                                  |
| DATA      | <p>Determines whether the Data record of the specified dataset or volume must be read. Valid only when the READ or READNEXT function code (see the RBA parameter in this table) is specified. Valid values:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - Read the Data record of the specified dataset or volume.</li> <li>▪ N (No) - Do not read the Data record.</li> </ul>                                                                                                 |

| Parameter | Description and Valid Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| KEY       | <p>Points to a valid index record (mapped by the CTTDVX, CTTDDX, or CTTDLX macro—Note: The index records are saved by the IOA Access Method in the file as compressed.) that serves as the key (or partial key) by which the CTTIOS macro retrieves the data record from the Media Database. Valid for READ requests. This parameter is related to parameters KEYTYPE and KEYLEN.</p> <p>For READ requests, this field must specify the key (or partial key) of the record to be read. For READNEXT requests, this field must specify the key of the record preceding the record to be read (that is, the key returned by the previous READ/READNEXT request).</p>                                                                                                                                                                                                                                                                       |
| KEYTYPE   | <p>Type of index being used. Valid when accessing data records that may be pointed to by more than one index type (that is, dataset records).</p> <p>Because volume records are indexed by only one key type (the V-type index), do not specify this parameter when performing keyed access of volume records.</p> <p>When performing keyed access dataset records, valid values are</p> <ul style="list-style-type: none"> <li>▪ D—when using the D-type key (mapped by DSECT CTTDDX). Default.</li> <li>▪ L—when using the L-type key (mapped by DSECT CTTDLX).</li> </ul>                                                                                                                                                                                                                                                                                                                                                             |
| KEYLEN    | <p>Points to a four-byte field that specifies the length of the key to be searched. The record length of the Index file is identical for all index types; therefore, this parameter is useful when using an index value shorter than the maximum index length of the file, or when using a partial key.</p> <p>The KELEN parameter must be used with both full keys and partial keys. Set all necessary fields in the key area (pointed to by parameter KEY) and specify a KEYLEN parameter that includes only the desired fields. When the full key is specified, set parameter KEYLEN to the full length of the key field. This is demonstrated in the examples provided in this chapter.</p> <p>The CTTIOS macro reads the entire index record into the area specified by parameter KEY. Therefore, when using this parameter, be sure to allocate sufficient storage for the entire index record, or storage overlays may occur.</p> |

| Parameter | Description and Valid Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MF        | <p>Macro invocation form. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ L (List Form)—generate all required data areas.</li> <li>▪ E (Execute Form)—perform the request specified by the macro parameters using the data areas generated by the List form of the macro. When the Execute form of the macro is used, it must be accompanied by a pointer to the List form of the macro.</li> </ul> <p>This same list form address must be used for all subsequent accesses of the Media Database using the CTTIOS macro until the Media Database is closed.</p> <p>All invocations of the CTTIOS macro must access the same parameter area. It is therefore preferable to specify the combined Execute and List forms of the macro.</p> |

The CTTIOS macro must be coded in accordance with all standard macro Assembler coding restrictions.

The values in general purpose registers 0, 1, 15 are modified by macro CTTIOS.

The CTTIOS macro accesses a set of variables generated by the CTTDBTP macro. Therefore, the CTTDBTP macro must be included in the source code of the calling program.

### Return Codes

The CTTIOS macro returns a return code in general purpose register 15. Do not confuse this code with the reason code returned in parameter RC described in the above table.

**Table 248 Return Codes for Macro CTTI**

| Return Code    | Description                                                                                                           |
|----------------|-----------------------------------------------------------------------------------------------------------------------|
| 0              | Successful execution of the request.                                                                                  |
| 4              | Requested record not found (READ requests) End-of-File (READNEXT requests).                                           |
| Greater than 4 | Unsuccessful execution of the request; the reason code indicates additional information about why the request failed. |

For more information about the return codes and reason codes of the CTTIOS macro, see the CTT200S message in the *INCONTROL for z/OS Messages Manual*.

### Base Level API Access of the Media Database

For sample macro code and exaith a CLOSE request. The CLOSE request automatically closes all the files and performs all other required activities.

## Reading Files

As mentioned earlier, Media Database READ requests can be made using either READ and READNEXT function codes. The differences between these requests must be understood if they are to be used effectively. The following topics describe these function codes and the various key-related and RBA-related parameters used with them.

### READ Requests

The READ request is used to read a specific data record from the Media Database. The READ request locates the requested data record and retrieves it into the area specified by parameter REC.

Either a keyed or non-keyed (that is, RBA) access method can be used to specify the record to be read.

When using keyed access to perform a READ from the Media Database, either a full or partial key can be specified. The READ request returns the whole index record (of the data record being read) into the area specified by the KEY parameter. Therefore, even when using a partial key, the KEY parameter must specify an area large enough to contain the whole index record (not just the partial key).

If the requested record is not found, either because there is no record at the specified RBA or because no record exists with the specified full or partial key, the CTTIOS macro returns a return code of 4.

Using the READ request in conjunction with partial keys is useful for reading from the Media Database when you have partial data only.

For example, assume you know a volser and want to find the name of the first dataset on the volser, but you do not know the label number for this dataset (for example, the first label may belong to a file that is already expired). In this case, you can use partial keys as follows:

- Select request type VOL, specify KEYTYPE=L, and set the VOLSER field in the L-type index to the known volser.
- Instead of specifying the label number, read using a KEYLEN parameter equal to the length of the volser number (without the label number).

The CTTIOS macro then retrieves the first record that matches the volser number, which is the dataset record of the first label number that exists for this volser. The area specified by the key field is updated with the full-key value of the retrieved record.

### READNEXT Requests

The READNEXT request is used to read the next data records from the Media Database. A READNEXT request can be used with either an RBA or a full index record. READNEXT finds and reads the record (matching the request type specified in the CTTIOS macro) that follows the specified RBA or index (that is, the next record), and then updates the KEY field or RBA field with the corresponding value of the record being read.

Because READNEXT requests require specification of an RBA value or a full index record, and because READ requests always store the RBA value or the full index record of the record read, a READ request must always precede a READNEXT request or set of READNEXT requests. The READ request can be specified with either the RBA or KEY parameters and partial keys can be used. The READNEXT request must then be specified without explicitly modifying the value in the KEY or RBA fields, and without specifying the KEYLEN parameter.

Because both READ and READNEXT update the key or RBA value with each invocation, it is possible to follow the READ request with more than one READNEXT request. Each READNEXT request, in its turn, reads the next record and updates the index record (pointed to by the KEY parameter) or the RBA (pointed to by the RBA parameter) to the value corresponding to the record being read.

The READNEXT function is generally used for reading a series of records in the Media Database, such as all records matching a prefix, or all records until the end-of-file.

For example, to read all records that match a dataset name prefix, first specify a READ with the partial key (the dataset prefix) followed by one or more READNEXT requests. The first record matching the dataset prefix is read (if one exists), and the READNEXT requests read all subsequent records (datasets) following the first match. If no matching record exists, CTTIOS positions the program for subsequent READNEXT requests according to ordinary key sorting rules.

Note: A READNEXT operation does not automatically stop after all records matching the prefix (or any other partial key) are read. The READNEXT request stops reading, and returns a return code of 4, only when the end-of-file is reached. Therefore, your application program must check when the READNEXT request results in a record that does not match the partial key, and it must then stop issuing READNEXT requests.

### **Sequential Reading of the Entire Media Database—Keyed vs. Non-Keyed Access**

The entire Media Database can be read either by using indexes (for example, reading all volsers by using the V-type index) or by using RBAs to read through the entire Media Database. Every program that requires sequential access to the entire Media Database must select the appropriate access method. When selecting the access method, consider the following points:

- When reading the Media Database using RBAs, one I/O operation is performed for each block (one block contains a number of records). Thus, the number of I/O operations required for reading the entire Media Database is relatively small. When reading the Media Database sequentially using indexes, each record access results in one access to the index, and one access to the data. This may result in a high I/O count and unsatisfactory performance for the program.
- When reading the Media Database using indexes, records are read in ascending sort order. When reading the Media Database using RBAs, records are read in the order they appear in the data file (not necessarily sorted).

It is much faster to read the Media Database using RBAs instead of indexes. If data items from the Media Database do not have to be sorted, it is highly recommended to use RBA-based reading of the Media Database.

Even if the data items retrieved from the Media Database must be sorted, it may be more efficient (depending on the environment) to read the Media Database using RBAs, and sort it after you have read it. You can also use sort utilities to merge volume and dataset records retrieved from the Media Database, instead of performing keyed accesses for every volume (or for every dataset).

### **Examples of Macro Access and Base Level API Functions**

The following topics present several examples of how to perform the various functions described in this chapter. Do not use these examples without appropriate modification. Most of the examples provided do not check the return code from macro CTTIOS. Some examples refer to Assembler symbols that are not included in the example.

#### **Loading the TCT into Storage**

The TCT (Control-M/Tape Control Table) is not a load module and therefore cannot be loaded using the LOAD macro. To load the TCT, use the CTTTLD macro. The example below shows a sample program that uses the CTTTLD macro to load the TCT.

**Code Sample for TCT Load Request**

|         |       |                                       |                     |
|---------|-------|---------------------------------------|---------------------|
|         | CALL  | CTTTLD, (LOADENV, TCTADDR, 0, 0)      | LOAD THE TCT        |
|         | LTR   | R15, R15                              | SUCCESSFUL?         |
|         | BNZ   | TCTFAIL                               | NO - TERMINATE      |
|         | .     |                                       |                     |
|         | .     |                                       |                     |
| TCTFAIL | WTO   | 'TCT LOAD FAILED, PROGRAM TERMINATED' |                     |
|         | ABEND | 8, DUMP ABEND PROGRAM WITH U0008      |                     |
|         | .     |                                       |                     |
|         | .     |                                       |                     |
| LOADENV | DC    | CL8' LOADENV'                         | CONSTANT FOR CTTTLD |
| TCTADDR | DS    | A                                     | ADDRESS OF TCT      |

**Code sample for Media Database OPEN Request**

|         |        |                                                                               |                           |
|---------|--------|-------------------------------------------------------------------------------|---------------------------|
|         | CALL   | CTTTLD, (LOADENV, TCTADDR, 0, 0)                                              | Load the TCT              |
|         | .      |                                                                               |                           |
|         | .      |                                                                               |                           |
|         | L      | R12, TCTADDR                                                                  |                           |
| OPENMDB | CTTIOS | ANY, OPEN, ENV=\$ENV, DBGLVL=\$DBG, TCT=(R12),<br>RC=RESCODE, MF=(E, IOSLIST) | Open the MDB *            |
|         | .      |                                                                               |                           |
|         | .      |                                                                               |                           |
| IOSLIST | CTTIOS | MF=L                                                                          |                           |
| \$ENV   | DC     | CL4' USER'                                                                    | Environment specification |
| \$DBG   | DC     | X' 00'                                                                        | Debug level               |
| TCTADDR | DS     | A                                                                             | Address of TCT            |
| RESCODE | DS     | F                                                                             |                           |
| LOADENV | DC     | CL8' LOADENV'                                                                 | Constant for CTTTLD       |

Note: The return code from the CTTTLD macro must also be checked.

**Code sample for CLOSE Request**

|          |        |                             |
|----------|--------|-----------------------------|
| CLOSEMDB | CTTIOS | ANY, CLOSE, MF=(E, IOSLIST) |
|          | .      |                             |
|          | .      |                             |
| IOSLIST  | CTTIOS | MF=L                        |

**Keyed Reading From the Media Database**

Control-M/Tape base level API provides keyed access to data residing in the Media Database. Keyed access is achieved using the indexes, as explained above.

The example below shows samples for keyed access requests from the Media Database.

**Code sample for "Read by Volser" Request**

|                                 |         |                                                                              |                         |
|---------------------------------|---------|------------------------------------------------------------------------------|-------------------------|
|                                 | L       | R2, =A(VOLKEY)                                                               | Volume key field        |
|                                 | USING   | DVX, R2                                                                      |                         |
|                                 | XC      | VOLKEY, VOLKEY                                                               |                         |
|                                 | MVC     | DVXVOLSR, =C' 123456'                                                        | Prepare vol. key        |
|                                 | LA      | R15, =A(L' DVXVOLSR)                                                         | Length of volser        |
| READVOL                         | CTTIOS  | VOL, READ, KEY=VOLKEY, RC=RESCODE, REC=VOLREC, KEYLEN=(R15), MF=(E, IOSLIST) | Read from MDB *         |
|                                 | LTR     | R15, R15                                                                     | Was read OK?            |
|                                 | BNZ     | NOTFOUND                                                                     | No - treat accordingly  |
|                                 | .       |                                                                              |                         |
|                                 | .       |                                                                              |                         |
| VOLKEY                          | DS      | XL(DVXLEN)                                                                   | Vol. index key          |
| VOLREC                          | DS      | XL(DVLLEN)                                                                   | Vol. record buffer      |
| RESCODE                         | DS      | F                                                                            | CTTIOS reason code      |
| IOSLIST                         | CTTIOS  | MF=L                                                                         | CTTIOS list form        |
|                                 | .       |                                                                              |                         |
|                                 | .       |                                                                              |                         |
| * Control-M/TAPE MAPPING MACROS |         |                                                                              |                         |
|                                 | CTTDVL  |                                                                              | Vol. data record        |
|                                 | CTTDVX  |                                                                              | Vol. index record       |
|                                 | CTTDBTP |                                                                              | CTTIOS parameters block |



**Sample "Read by Dataset Name" Request**

Since D-type indexes are non-unique (that is, more than one dataset can have the same name), the sample shown below reads only the record of the first dataset in the Media Database with the specified name.

**Code sample for "Read by Dataset Name" Request**

|                                   |                                                                        |                         |
|-----------------------------------|------------------------------------------------------------------------|-------------------------|
| LA                                | R2, DSNKEY                                                             | D. S. key field         |
| USING                             | DDX, R2                                                                |                         |
| XC                                | DSNKEY, DSNKEY                                                         |                         |
| MVC                               | DDXDSN, =CL44' CTT. SAMPLE. FILE'                                      | Prepare D. S. key       |
| LA                                | R15, =A(L' DDXDSN)                                                     |                         |
| CTTIOS                            | DS, READ, KEY=DSNKEY, REC=DSNREC, KEYLEN=(R15), ENQ=Y, MF=(E, IOSLIST) | Read from MDB *         |
| LTR                               | R15, R15                                                               | Was read OK?            |
| BNZ                               | NOTFOUND                                                               | No - treat accordingly  |
| .                                 |                                                                        |                         |
| .                                 |                                                                        |                         |
| DSNKEY                            | DS XL(DDXLEN)                                                          | D. S. index key         |
| DSNREC                            | DS XL(DDSLEN)                                                          | D. S. record buffer     |
| RESCODE                           | DS F                                                                   | CTTIOS reason code      |
| IOSLIST                           | CTTIOS MF=L                                                            | CTTIOS list form        |
| .                                 |                                                                        |                         |
| .                                 |                                                                        |                         |
| * Control - M/TAPE MAPPING MACROS |                                                                        |                         |
| CTTDDS                            |                                                                        | D. S. data record       |
| CTTDDX                            |                                                                        | D. S. index record      |
| CTTDBTP                           |                                                                        | CTTIOS parameters block |

Note: In the above example, the KEYTYPE parameter is omitted. It defaults to KEYTYPE=D.

**Code sample for "Read by Volser and File Sequence Number" Request**

|        |                                                                            |                        |
|--------|----------------------------------------------------------------------------|------------------------|
| LA     | R2, DLSKEY                                                                 | D. S. key field        |
| USING  | DLX, R2                                                                    |                        |
| XC     | DLSKEY, DLSKEY                                                             |                        |
| MVC    | DLXVOLSR, =C' 123456'                                                      | Copy volser            |
| LA     | R3, 1                                                                      | First D. S. on volser  |
| STCM   | R3, B' 0011', DLXLBLNM                                                     | Store label number     |
| LA     | R15, =A(L' DLXVOLSR+L' DLXLBLNM)                                           |                        |
| CTTIOS | DS, READ, KEY=DLSKEY, KEYLEN=(R15), KEYTYPE=L, REC=DSNREC, MF=(E, IOSLIST) | Read from MDB *        |
| LTR    | R15, R15                                                                   | Was read OK?           |
| BNZ    | NOTFOUND                                                                   | No - treat accordingly |
| .      |                                                                            |                        |
| .      |                                                                            |                        |

|                                                                                         |         |                                                                 |                              |
|-----------------------------------------------------------------------------------------|---------|-----------------------------------------------------------------|------------------------------|
| DLSKEY                                                                                  | DS      | XL(DLXLEN)                                                      | D. S. L-type key             |
| DSNREC                                                                                  | DS      | XL(DDSLEN)                                                      | D. S. record buffer          |
| RESCODE                                                                                 | DS      | F                                                               | CTTI0S reason code           |
| I0SLIST                                                                                 | CTTI0S  | MF=L                                                            | CTTI0S list form             |
| .                                                                                       |         |                                                                 |                              |
| .                                                                                       |         |                                                                 |                              |
| * Control-M/TAPE MAPPING MACROS                                                         |         |                                                                 |                              |
|                                                                                         | CTTDDS  |                                                                 | D. S. data record            |
|                                                                                         | CTTDLX  |                                                                 | D. S. L-type index           |
|                                                                                         | CTTDBTP |                                                                 | CTTI0S parameters block      |
| <hr/>                                                                                   |         |                                                                 |                              |
| <b>Code sample for "Read All Datasets With Specified Prefix Using READNEXT" Request</b> |         |                                                                 |                              |
|                                                                                         | LA      | R2, DSNKEY                                                      | D. S. key field              |
|                                                                                         | USING   | DDX, R2                                                         |                              |
|                                                                                         | L       | R3, =A(DSNREC)                                                  | Record addressability        |
|                                                                                         | USING   | DDS, R3                                                         |                              |
|                                                                                         | XC      | DSNKEY, DSNKEY                                                  | Clear index                  |
|                                                                                         | MVC     | DDXDSN(L' DSPRFX), DSPRFX                                       | Dataset's prefix             |
|                                                                                         | LA      | R15, =A(L' DSPRFX)                                              | Length of prefix             |
|                                                                                         | CTTI0S  | DS, READ, KEY=DSNKEY, REC=DSNREC, KEYLEN=(R15), MF=(E, I0SLIST) | Read from MDB *              |
|                                                                                         | .       |                                                                 |                              |
|                                                                                         | .       |                                                                 |                              |
| READNEXT                                                                                | CTTI0S  | DS, READNEXT, KEY=DSNKEY, REC=DSNREC, MF=(E, I0SLIST)           | Read next dataset from MDB * |
|                                                                                         | LTR     | R15, R15                                                        | Successful ?                 |
|                                                                                         | BNZ     | NOMORE                                                          | No - skip further READNEXTs  |
|                                                                                         | CLC     | DDSDSN(L' DSPRFX), DSPRFX                                       | Is it still the same prefix  |
|                                                                                         | BE      | READNEXT                                                        | Yes - loop again             |
| NOMORE                                                                                  | EQU     |                                                                 | *                            |
|                                                                                         | .       |                                                                 |                              |
|                                                                                         | .       |                                                                 |                              |
| DSPRFX                                                                                  | DC      | CL15' DATASET. PREFIX. '                                        | Dataset's prefix             |
| DSNKEY                                                                                  | DS      | XL(DDXLEN)                                                      | D. S. index key              |
| DSNREC                                                                                  | DS      | XL(DDSLEN)                                                      | D. S. record buffer          |
| RESCODE                                                                                 | DS      | F                                                               | CTTI0S reason code           |
| I0SLIST                                                                                 | CTTI0S  | MF=L                                                            | CTTI0S list form             |
| .                                                                                       |         |                                                                 |                              |
| .                                                                                       |         |                                                                 |                              |
| * Control-M/TAPE MAPPING MACROS                                                         |         |                                                                 |                              |
|                                                                                         | CTTDDS  |                                                                 | D. S. data record            |
|                                                                                         | CTTDDX  |                                                                 | D. S. index record           |
|                                                                                         | CTTDBTP |                                                                 | CTTI0S parameters block      |

### Non-Keyed (RBA-Based) Reading of the Media Database

Control-M/Tape Base Level API also provides non-keyed access to data residing in the Media Database. Non-keyed access is achieved by using the RBA as the pointer to the desired record in the data file, as explained above.

the example below shows a few sample RBA-based access requests from the Media Database.

#### Code sample for "Read a Record" Request

|                                 |                                                              |                                    |
|---------------------------------|--------------------------------------------------------------|------------------------------------|
| MVC                             | RECRBA, =X' 000203'                                          | Set the RBA to block 2, record 3   |
| CTTIOS                          | ANY, READ, RC=RESCODE, REC=AREA, RBA=RECRBA, MF=(E, IOSLIST) | Read from MDB *                    |
| LTR                             | R15, R15                                                     | Does record exists ?               |
| BNZ                             | NOTFOUND                                                     | No - treat accordingly             |
| L                               | R3, =A(AREA)                                                 | R3 points to the record read       |
| USING                           | DVL, R3                                                      |                                    |
| CLI                             | DVLRTYPE, DVLRVL                                             | Is it a volume record ?            |
| BE                              | TREATVOL                                                     | Yes - treat accordingly            |
| CLI                             | DVLRTYPE, DDSRDS                                             | Is it a dataset record ?           |
| BE                              | TREATDS                                                      | Yes - treat accordingly            |
| B                               | TREATOTH                                                     | Treat other record types           |
| .                               |                                                              |                                    |
| .                               |                                                              |                                    |
| AREA                            | DS CL(DVLLLEN)                                               | Record buffer (both vol and D. S.) |
| RECRBA                          | DS XL4                                                       | RBA of record                      |
| .                               |                                                              |                                    |
| .                               |                                                              |                                    |
| * Control-M/TAPE MAPPING MACROS |                                                              |                                    |
| CTTDVL                          |                                                              | Vol. data record                   |
| CTTDDS                          |                                                              | D. S. data record                  |
| CTTDBTP                         |                                                              | CTTIOS parameters block            |

In this sample

- You do not have to check whether the record being read is free or active, because the CTTIOS macro does that for you. If the record is free (that is, not active), the macro returns a return code of 4 (not found).
- Because the headers of all record types are the same, you can compare the record type FIELD from the volume DSECT against the record type EQUATE from the dataset DSECT.

**Code sample for "Read Next Record" Request**

|        |                                         |                               |   |
|--------|-----------------------------------------|-------------------------------|---|
| MVC    | RECRBA, DVLRBA                          | Set RBA of current record     |   |
| CTTIOS | ANY, READNEXT, REC=AREA,                | Read the next record from MDB | * |
|        | RBA=RECRBA, RC=RESCODE, MF=(E, IOSLIST) |                               |   |
| LTR    | R15, R15                                |                               |   |
|        | .                                       |                               |   |
|        | .                                       |                               |   |

In this sample

- The rest of the sample program can be the same as the one in the above "Read a Record" Request sample .
- When using the READNEXT function code, the CTTIOS macro skips free records and looks for active records to read. A return code of 4 (not found) signals that the end-of-file was reached.

**Sample Media Database Access Program**

This sample access program sequentially reads all the Media Database using RBAs and produces the following reports:

- all volumes with all the datasets for each volume
- all datasets with all the volumes for each dataset

This program provides a working example for a wide variety of requests available through the CTTIOS macro.

**Code sample for Media Database Access Program**

```

*****
*
*                               CTTISAMI
*
*
*  FUNCTION:  SAMPLE PROGRAM TO DEMONSTRATE ACCESS TO THE Control-M/
*              TAPE MEDIA DATABASE (MDB) USING THE BASE LEVEL API.
*              THE PROGRAM READS THE MDB AND PRODUCES TWO REPORTS:
*              1. A VOLUME REPORT CONTAINING ALL VOLUMES IN THE MDB
*                 AND ALL DATASETS EXISTING ON EACH VOLUME
*              2. A DATASET REPORT CONTAINING ALL DATASETS IN THE MDB
*                 AND ALL VOLUMES THAT ARE PART OF EACH DATASET
*
*  RETURN CODES: 00 - OK
*                 04 - MDB EMPTY
*                 08 - ERROR DURING PROCESSING
*
*  LOGIC:  THE PROGRAM READS THE MDB SEQUENTIALLY USING RBAS. VOLUME
*           AND DATASET RECORDS ARE PROCESSED, AND OTHER RECORDS ARE
*           DISREGARDED.
*           FOR VOLUME RECORDS, THE DATASETS OF THE VOLUME ARE READ,
*           USING THE L-TYPE INDEX. A READ REQUEST WITH NO LABEL
*           NUMBER (VOLSER ONLY) IS PERFORMED FIRST. THE READNEXT
*           REQUEST IS THEN USED REPEATEDLY UNTIL ALL DATASETS ON THE
*           VOLUME ARE PROCESSED.
*           FOR DATASET RECORDS, THE VOLUMES OF THE DATASET ARE READ
*           THE FIRST VOLSER IS TAKEN FROM THE DATASET RECORD, AND
*           AFTERWARDS, THE VOLUME RECORDS ARE READ, AND THE
*           NEXT VOLUME RETRIEVED FROM THEM, UNTIL ALL VOLUMES OF THE
*           DATASET HAVE BEEN READ.
*
*

```

```

* DD CARDS:  DAMDB    -  MDB DATA FILE
*             DAMDI    -  MDB INDEX FILE
*             DATRC    -  TRACE FILE
*             DARPTVOL -  VOLUME REPORT FILE
*             DARPTDSN -  DATASET NAMES REPORT FILE
*
* DISCLAIMER: THIS SAMPLE PROGRAM IS PROVIDED ON AN 'AS IS' BASIS,
*             WITHOUT ANY WARRANTY, EITHER EXPRESS OR IMPLIED
*
* REGISTERS:  R13     -  BASE
*             R2      -  MDB RECORD KEY (WHERE APPLICABLE)
*             R3      -  MDB RECORD BUFFER
*
* ATTRIBUTES: AMODE 31
*             RMODE 24
*
* TO COMPILE, LINK AND RUN THE PROGRAM
*
* //CTTSAMI JOB ...
* //          JCLLIB ORDER=IOA.PROCLIB          <<<----- CHANGE
* //          INCLUDE MEMBER=IOASET
* //ASM       EXEC IOAASM
* //C.SYSIN   DD DISP=SHR, DSN=&ILPREF. . SAMPLE(CTTSAMI)
* //L.SYSLMOD DD DISP=SHR, DSN=YOUR. LOAD. LIBRARY <<<----- CHANGE
* //L.SYSIN   DD *
*             INCLUDE SYSLIB(CTTTRC)
*             INCLUDE SYSLIB(CTTTLD)
*             MODE RMODE(24), AMODE(31)
*             ENTRY CTTSAMI
*             NAME CTTSAMI(R)
* //*
* //RUN EXEC  PGM=CTTSAMI, COND=(0, NE), REGION=60M
* //STEPLIB  DD DISP=SHR, DSN=YOUR. LOAD. LIBRARY <<<----- CHANGE
* //          DD DISP=SHR, DSN=&STEPLIB
* //DAPARM   DD DISP=SHR, DSN=&ILPREF. . PARM
* //          DD DISP=SHR, DSN=&ILPREF. . IOAENV
* //DAMDB    DD DISP=SHR, DSN=&DBPREFT. . MDD. E000
* //DAMDI    DD DISP=SHR, DSN=&DBPREFT. . MBI. E000
* //DATRC    DD DISP=SHR, DSN=&DBPREFT. . TRC
* //DARPTVOL DD SYSOUT=*
* //DARPTDSN DD SYSOUT=*
* //
*
*****
EJECT
CTTDDS          D. S.  DATA RECORD
CTTDVL          VOL.  DATA RECORD
CTTDVX          VOL.  INDEX RECORD
CTTDDX          D. S.  INDEX RECORD
CTTDLX          D. S.  L- TYPE INDEX
CTTDBTP         CTTIOS PARAMETERS BLOCK
EJECT
MACRO
&NAME MYPUT &DCB, &REC
&NAME LA      R15, *+6          ADDRESS FOLLOWING BASSM
      BASSM R14, R15          CHANGE AMODE
      PUT   &DCB, &REC        PUT THE DESIRED RECORD
      LA    R15, *+10         ENDING ADDRESS
      O     R15, =X' 80000000'
      BSM   0, R15
      MEND
*****
EJECT
CTTSAMI AMODE 31
CTTSAMI RMODE 24
CTTSAMI CSECT
        BEGIN *, EQU=YES
        CTTLEVEL

```

```

SPACE 3
***
* INITIALIZE PROGRAM - LOAD THE TCT AND OPEN FILES
***
CALL CTTTLD, (LOADENV, TCTADDR, 0, 0)  LOAD THE TCT
LTR  R15, R15                          SUCCESSFUL ?
BNZ  LTCTFAIL                          NO - TERMINATE
SPACE 3
OPEN  (RPTVOL, OUTPUT)                OPEN VOLUME REPORT OUTPUT FILE
LTR  R15, R15                          SUCCESSFUL ?
BNZ  OUTERROR                          NO - TERMINATE
OPEN  (RPTDSN, OUTPUT)                OPEN DATASET REPORT OUTPUT FILE
LTR  R15, R15                          SUCCESSFUL ?
BNZ  OUTERROR                          NO - TERMINATE
MYPUT RPTVOL, VOLMSG                  PRINT VOLUME REPORT HEADER
MYPUT RPTDSN, DSNMSG                  PRINT DATASET REPORT HEADER
SPACE 3
L     R12, TCTADDR
MVC  MSGOP, =CL8' OPEN'
CTTIOS ANY, OPEN, ENV=SENV, DBGLVL=SDBG, OPEN MDB
      TCT=(R12), RC=RESCODE, MF=(E, IOSLIST)
LTR  R15, R15                          SUCCESSFUL ?
BNZ  MDBERROR                          NO - TERMINATE
SPACE 3
***
* SEQUENTIAL READING OF THE MDB, BY RBA
***
MVC  RECRBA, RBAO                      START WITH THE FIRST RECORD
MVC  MSGOP, =CL8' READ'
CTTIOS ANY, READ, RC=RESCODE, REC=AREA, RBA=RECRBA,
      MF=(E, IOSLIST) READ THE FIRST RECORD
LTR  R15, R15                          SUCCESSFUL ?
BZ   READOK                            YES - PROCESS THE NEXT RECORD
CH   R15, =H' 4'                       WAS IT BECAUSE FIRST RECORD IS FREE?
BH   MDBERROR                          NO - TERMINATE
      OTHERWISE TRY TO READ THE NEXT ONE
MVC  MSGOP, =CL8' READNEXT'
CTTIOS ANY, READNEXT, RC=RESCODE, REC=AREA, READ NEXT RECORD
      RBA=RECRBA, MF=(E, IOSLIST)
LTR  R15, R15                          WAS READNEXT SUCCESSFUL ?
BZ   READOK                            YES - PROCESS THE RECORD
CH   R15, =H' 4'                       E. O. F ?
BE   MDBEMPTY                          YES - MDB IS EMPTY
B    MDBERROR                          OTHERWISE - TERMINATE
SPACE 3
***
* LOOP ON ALL RECORDS
***
READOK EQU *
L      R3, =A(AREA) ESTABLISH ADDRESSABILITY
USING DVL, R3      TO THE RECORD BUFFER
CLI   DVLRTYPE, DVLRLV IS THIS A VOLUME RECORD ?
BE    TREATVOL     YES - TREAT ACCORDINGLY
CLI   DVLRTYPE, DDSRDS IS THIS A DATASET RECORD ?
BE    TREATDS      YES - TREAT ACCORDINGLY
READNEXT EQU *
MVC  MSGOP, =CL8' READNEXT'
CTTIOS ANY, READNEXT, RC=RESCODE, REC=AREA, READ NEXT RECORD
      RBA=RECRBA, MF=(E, IOSLIST)
LTR  R15, R15                          WAS READ SUCCESSFUL ?
BZ   READOK                            YES - PROCESS THIS RECORD
CH   R15, =H' 4'                       E. O. F ?
BE   EODAD          YES - ISSUE MESSAGE
B    MDBERROR       OTHERWISE TERMINATE
DROP R3
SPACE 3
***
* TREAT ONE VOLUME RECORD - PRINT ALL ITS DATASETS

```

```

***
TREATVOL EQU *
        USING DVL, R3          ESTABLISH ADDRESSABILITY
        MVC    VOLUME, DVLVOLSR  MOVE VOLSER TO OUTPUT RECORD
        MYPUT  RPTVOL, OUTVOL
        TM     DVLSTAT, DVLSSCR  IS IT SCRATCH ?
        BNO    GETDSNS          NO - GET DATASETS ON THE VOLUME
        MVC    DSNNAME, SCRIND   ELSE - ISSUE SCRATCH MESSAGE
        MYPUT  RPTVOL, OUTDSN    PRINT THE SCRATCH MESSAGE
        B      ENDEVOL          END VOLUME PROCESSING
GETDSNS  EQU *
        LA     R2, DLSKEY       ESTABLISH ADDRESSABILITY
        USING  DLX, R2          TO D.S. L-TYPE INDEX
        XC     DLSKEY, DLSKEY    CLEAR INDEX FIELD
        MVC    DLXVOLSR, DVLVOLSR MOVE VOLSER TO KEY FIELD
        DROP   R3              VOLUME RECORD NOT NEEDED ANY MORE
        LA     R15, =A(L' DLXVOLSR)
        MVC    MSGOP, =CL8' READ'
        CTTIOS DS, READ, KEY=DLSKEY, READ FROM MDB
        RC=RESCODE, *RC *
        KEYTYPE=L, KEYLEN=(R15), REC=AREA, MF=(E, IOSLIST)
        CH     R15, =H' 4'      *NFD
        BE     ENDEVOL          *NFD1
        BH     MDBERROR        *NFD
PRINTDSN EQU *
        USING  DDS, R3          ADDRESSABILITY (R3->>RECORD BUFFER)
        MVC    DSNNAME, DDSDSN  MOVE DSNNAME TO OUTPUT RECORD
        MYPUT  RPTVOL, OUTDSN   PRINT IT
        MVC    MSGOP, =CL8' READNEXT'
        CTTIOS DS, READNEXT, KEY=DLSKEY, READ NEXT RECORD FROM MDB *
        RC=RESCODE, *RC *
        KEYTYPE=L, REC=AREA, MF=(E, IOSLIST)
        LTR    R15, R15         SUCCESSFUL ?
        BZ     PROCDSN         YES - PROCESS DSN
        CH     R15, =H' 4'      NO - WAS IT BECAUSE THE END OF MDB ?
        BH     MDBERROR        NO - ISSUE AN ERROR MESSAGE
        B      ENDEVOL         YES - PROCESS NEXT VOLUME
PROCDSN  EQU *
        CLC    DLXVOLSR, VOLUME ARE WE STILL IN THE SAME VOLUME ?
        BE     PRINTDSN        YES - PRINT IT AND PROCESS NEXT DS
ENDVOL   EQU *
        B      READNEXT        GO TO GET NEXT RECORD
        SPACE 3
***
* TREAT ONE DATASET RECORD - PRINT ALL ITS VOLUMES
***
TREATDS  EQU *
        USING  DDS, R3          ESTABLISH ADDRESSABILITY
        MVC    DSNNAME, DDSDSN  MOVE DSNNAME TO OUTPUT RECORD
        MYPUT  RPTDSN, OUTDSN   PRINT IT
        MVC    VOLUME, DDSVOLSR MOVE FIRST VOLSER TO MESSAGE
        MYPUT  RPTDSN, OUTVOL    PRINT MESSAGE
        LH     R4, DDSVOLS#     NUMBER OF VOLUMES IN DATASET
        CH     R4, =H' 1'      IS THERE ONLY ONE VOL IN DATASET ?
        BNH    ENDDSN          YES - END PROCESSING OF DATASET
        DROP   R3              ADDRESSABILITY NOT NEEDED ANY MORE
        SPACE 3
***
* FIND ALL VOLUMES OF DATASET
***
        LA     R2, DVXKEY       ESTABLISH ADDRESSABILITY
        USING  DVX, R2          TO VOLUME INDEX FIELD
        USING  DVL, R3          AND TO VOLUME RECORD
        XC     DVXKEY, DVXKEY    CLEAR VOLUME KEY FIELD
        BCTR   R4, 0            DECREMENT VOL COUNT (1 PRINTED)
NEXTVOL  EQU *
        MVC    DVXVOLSR, VOLUME
        LA     R15, =A(L' DVXVOLSR)

```

```

MVC MSGOP,=CL8' READ'
CTTI OS VOL, READ, KEY=DVXKEY, READ FROM MDB *
RC=RESCODE, *
REC=AREA, KEYLEN=(R15), MF=(E, IOSLI ST)
CH R15,=H' 4'
BE ENDDSN
BH MDBERROR
MVC VOLUME, DVLNEXT NEXT VOLUME (PREV ALREADY PRINTED)
MYPUT RPTDSN, OUTVOL PRINT THE VOLUME SERIAL
BCT R4, NEXTVOL AND GO GET NEXT VOLUME (IF ANY)
ENDDSN EQU * END OF DATASET PROCESSING
B READNEXT GO TO GET NEXT RECORD
DROP R3
SPACE 3

*
MDBERROR EQU *
LR R5, R15
CVD R5, DOUBLE
UNPK MSGRC(2), DOUBLE+6(2)
OI MSGRC+1, X' FO'

*
L R5, RESCODE
CVD R5, DOUBLE
UNPK MSGRSN(5), DOUBLE+5(3)
OI MSGRSN+4, X' FO'

*
IOAEDIT 'CTT200S _ FAILED FOR DAMDB DATASET.', (MSGOP, 8), *
INTO=MDBERR1+8, REGSAVE=YES, MF=(E, WORKEDIT)
MDBERR1 WTO 'CTT200S OPER FAILED FOR DAMDB DATASET.'
*
IOAEDIT ' RC=_, REASON=_, (MSGRC, 2, MSGRSN, 5), , *
INTO=MDBERR2+8, REGSAVE=YES, MF=(E, WORKEDIT)
MDBERR2 WTO ' RC=XX, REASON=YYYYY'
*
B RET8
OUTERROR WTO 'UNABLE TO OPEN OUTPUT FILE'
B RET8
LTCTFAIL WTO 'TCT LOAD FAILED'
B RET8
MDBEMPTY WTO 'MDB IS EMPTY'
B RET4
EODAD EQU *
MYPUT RPTVOL, EOFMSG
MYPUT RPTDSN, EOFMSG
CLOSE (RPTVOL, , RPTDSN) CLOSE OUTPUT FILES
CTTI OS ANY, CLOSE, *
RC=RESCODE, *
MF=(E, IOSLI ST)
CALL CTTTLD, (DELETE, TCTADDR, 0, 0) FREE TCT AREA
B RET0
RET8 LA R15, 8
B ENDPGM
RET4 LA R15, 4
B ENDPGM
RET0 SLR R15, R15
B ENDPGM
ENDPGM EQU *
SPACE 3
BRTRN (15)
EJECT

***
* CONSTANTS
***
RBA0 DC XL4' 00000100' RBA OF FIRST RECORD IN DATABASE
SENV DC CL4' SAMI'
SDBG DC X' 00'
LOADENV DC CL8' LOADENV'
DELETE DC CL8' DELETE'

```



```

PATTERN  DC      X' 402120202020'
          SPACE 3
***
* DATA AREAS
***
AREA      DS      CL(DVLEN)  RECORD BUFFER (BOTH VOL AND D. S.)
RECRBA    DS      XL4        RBA OF RECORD
RESCODE   DS      F          REASON CODE OF PROGRAM
DLSKEY    DS      XL(DLXLEN) D. S. L- TYPE INDEX KEY
DVXKEY    DS      XL(DVXLEN) VOL.  INDEX RECORD
TCTADDR   DS      A          ADDRESS OF THE TCT
DOUBLE    DS      D
MSGRC     DS      CL6        RC FROM CTTIOS FOR CTT200S
MSGRSN    DS      CL6        REASON CODE FOR CTT200S
MSGOP     DS      CL8        OPERATION FOR CTT200S
          DS      OF
WORKEDIT  DS      CL256      OPERATION FOR CTT200S
          SPACE 3
***
* OUTPUT MESSAGES
***
OUTDSN    DS      CL80        DATASET OUTPUT RECORD
          ORG      OUTDSN
          DC      CL6' DSN= '   RECORD PREFIX
DSNAME    DS      CL(L' DDSN) DATASET NAME
          DC      CL(80+OUTDSN-*)' ' FILLER
          ORG
OUTVOL    DS      CL80        VOLUME OUTPUT RECORD
          ORG      OUTVOL
          DC      CL6' VOL= '   RECORD PREFIX
VOLUME    DS      CL(L' DVLVOLSR) VOLUME SERIAL
          DC      CL(80+OUTVOL-*)' ' FILLER
          ORG
VOLMSG    DC      CL80' *** VOLUME REPORT ***'
DSNMSG    DC      CL80' *** DATASET REPORT ***'
EOFMSG    DC      CL80' *** END OF MDB WAS REACHED *** '
SCRIND    DC      CL44' *** THIS IS A SCRATCH VOLUME ***'
          SPACE 3
***
* CTTIOS IN LIST FORM
***
IOSLIST   CTTIOS MF=L
          SPACE 3
***
* DATA Control BLOCKS
***
RPTVOL    DCB      DDNAME=DARPTVOL, MACRF=PM, LRECL=81, RECFM=FBA,
          DSORG=PS
RPTDSN    DCB      DDNAME=DARPTDSN, MACRF=PM, LRECL=81, RECFM=FBA,
          DSORG=PS
          END
High Level API

```

Calling programs that access the Control-M/Tape Media Database using basic level API must load a Control-M/Tape Control Table and allocate the Media Database components. *High Level API* (on page [689](#)) performs these actions automatically.

## High Level API

High level API uses the real-time environment TCT and the real-time environment's Media Database components.

As a result

- high level API cannot be used when the Control-M/Tape real-time environment is not active
- calling programs intended for use with high level API have to be APF-authorized

Control-M/Tape high level API is implemented by the following Assembler macros:

**Table 249 Assembler Macros for Implementing Control-M/Tape High Level APIs**

| Macro    | Description                                                              |
|----------|--------------------------------------------------------------------------|
| CTTACCDB | Accesses the Media Database.                                             |
| CTTCHKDB | Checks the last access of the Media Database (using the CTTACCDB macro). |

The following functions can be performed by high level API using macro CTTACCDB:

**Table 250 High Level API Functions using the CTTACCDB macro**

| Function | Description                                                                                    |
|----------|------------------------------------------------------------------------------------------------|
| START    | Initializes the high level API. Access of the Media Database must begin with this function.    |
| READVOL  | Reads a requested volume record from the Media Database.                                       |
| ADDVOL   | Adds a volume record to the Media Database.                                                    |
| DELVOL   | Deletes a volume record from the Media Database.                                               |
| UPDTVOL  | Updates a volume record in the Media Database.                                                 |
| END      | Terminates high level API functions. Access of the Media Database must end with this function. |

After each run of the CTTACCDB macro, it is highly recommended that you check the completion code of the access to the Media Database using the CTTCHKDB macro. This macro tests the return code from the API and transfers control to an error handling routine that is written by the user as part of the calling program.

### The CTTACCDB Macro

High level API access to the Media Database is performed using the CTTACCDB macro.

**Format**

Instructions for the CTTACCDDB macro are formatted as follows:

|              |                  |                                    |
|--------------|------------------|------------------------------------|
| <b>label</b> | <b>CTTACCDDB</b> | <i>function-code,</i>              |
|              |                  | <b>R</b> <i>EC=buffer-address,</i> |
|              |                  | <i>VOL=volser,</i>                 |
|              |                  | <b>PARMS=parm-work-area</b>        |

**Table 251 Parameters**

| Parameter            | Description                                                                                                                                                                                                         |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>function-code</i> | Specifies a function requested from the CTTACCDDB macro. Mandatory. This parameter must always be the first parameter.                                                                                              |
| START                | Performs initialization functions required to enable access to the Media Database of Control-M/Tape (for example, gain access to the real-time environment TCT, and open the real-time environment Media Database). |
| END                  | Performs cleanup functions after using high level API (for example, close the Media Database).                                                                                                                      |
| READVOL              | Reads a volume record from the Media Database.<br>A buffer-address, a volser, and a parm-work-area must be specified with this function code.                                                                       |
| ADDVOL               | Adds a volume record to the Media Database.<br>A buffer-address and a parm-work-area must be specified with this function code.                                                                                     |
| DELVOL               | Deletes a volume record from the Media Database.<br>A volser and a parm-work-area must be specified with this function code.                                                                                        |
| UPDTVOL              | Updates a volume record in the Media Database.<br>A buffer-address and a parm-work-area must be specified with this function code.                                                                                  |

| Parameter             | Description                                                                                                                                                                                                                                                                                                                                       |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>buffer-address</i> | Specifies a buffer used by the CTTACCDB macro for either storing data retrieved from the Media Database, or storing data to be inserted in the Media Database. This variable must point to an area defined as follows:<br><br>REC    DS (DVLLLEN)X<br><br>This parameter is mandatory when function-code READVOL, ADDVOL or UPDTVOL is specified. |
| <i>volser</i>         | Specifies a volume serial number. This variable must point to an area six characters in length. This variable is mandatory when function-code READVOL or DELVOL is specified.                                                                                                                                                                     |
| <i>parm-work-area</i> | Specifies a macro invocation work area. Mandatory. This variable must point to an area defined as follows:<br><br>ADBPARM DS (ADBPLEN)X                                                                                                                                                                                                           |

All invocations of the CTTACCDB macro must access the same parameter area. Therefore, you must use the same *parm-work-area* in all calls to the CTTACCDB macro.

The CTTACCDB macro must be coded in accordance with all standard macro assembler coding restrictions.

Values in general purpose registers 0, 1, 14, and 15 are modified by the CTTACCDB macro.

The CTTACCDB macro accesses a set of variables generated by macro CTTADBP and by the CTTDBTP macro. Therefore, the source of the calling program must include both these macros.

### The CTTCHKDB Macro

This macro is used to check return codes resulting from access of the Media Database using the CTTACCDB macro.

#### Format

Instructions for the CTTCHKDB macro are formatted as follows:

|              |                 |                                    |
|--------------|-----------------|------------------------------------|
| <b>label</b> | <b>CTTCHKDB</b> | <b>ERR=</b> <i>error-routine</i> , |
|              |                 | <b>PARMS=</b> <i>work-area</i>     |

**Table 252      Format for Macro CTTCHKDB Instructions**

| Term                 | Description                                                                                                                                                           |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>error-routine</i> | Points to a subroutine in the source code of the calling program that handles Media Database access errors. For more information, see the following topic. Mandatory. |
| <i>work-area</i>     | Invocation work area of the last CTTACCDB macro. Mandatory.<br><br>The value for this field must be the same work area specified in the parameters for CTTACCDB.      |

The CTTCHKDB macro must be coded in accordance with all standard macro Assembler coding restrictions.

Values in general purpose registers 0, 1 and 15 are modified by the CTTCHKDB macro.

### Media Database Error Handling Routine

The calling program must supply an error handling routine. This error handling routine is given control whenever the CTTCHKDB macro determines that the last access to the Media Database was unsuccessful (for example, the requested volume was not found).

High level API invokes the CTTIOS macro to access the Media Database. For more information, see [Macro CTTIOS](#) (on page 672).

High level API accesses a set of variables generated by the CTTADBP macro. Some of these variables contain information relevant to the Media Database error handling routine. The variables are located in the area specified using the PARMS parameter to the CTTACCDB macro, and are mapped by the CTTADBP macro. The following table describes these variables:

**Table 253**      **Variables Generated by Macro CTTADBP, Accessible by High Level APIs**

| Variable | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADBP RC  | Return code from the last high level API function. Full word. Possible values are <ul style="list-style-type: none"> <li>▪ 0—OK</li> <li>▪ 8—invalid function requested</li> <li>▪ 12—Control-M/Tape TCT not found (that is, Control-M/Tape not active)</li> <li>▪ 16—a CTTIOS command failed (see variables ADBPIRC and ADBPIRSN in this table)</li> <li>▪ 20—internal error (CTTIOS handle not supplied)</li> <li>▪ 24—Media Database record not supplied</li> <li>▪ 28—calling program is not APF-authorized</li> <li>▪ 32—key (volser) not supplied</li> <li>▪ 36—function code not allowed (denied by Exit CTTX006)</li> </ul> |
| ADBPFUNC | Last CTTACCDDB function. The field for this variable is eight characters long.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| ADBPIRC  | Return code from the last run of the CTTIOS macro that was invoked by the high level API. Full word. (For more details on the return codes of the CTTIOS macro, see the CTT200S message in the <i>INCONTROL for z/OS Messages Manual</i> .)                                                                                                                                                                                                                                                                                                                                                                                         |
| ADBPIRSN | Reason code returned from the last run of the CTTIOS macro invoked by the high level API. Full word. (For more information on the reason codes of the CTTIOS macro, see the CTT200S message in the <i>INCONTROL for z/OS Messages Manual</i> .)                                                                                                                                                                                                                                                                                                                                                                                     |
| ADBPIOPR | Last CTTIOS function issued by the high level interface. This variable is contained in an 8-character field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Example of Macro Code Usage and JCL for High Level API

This sample access program reads the volume record of volume V00001 from the Media Database using high level API, and issues a message about the status of this volume (that is, SCRATCH, ACTIVE, or NOT FOUND IN MDB). This sample also includes an example for the Media Database error handling routine.

Note: The code shown below is only an example. Do not use it without appropriate modification.

**Figure 94 Example of Macro Usage and JCL for High Level API**

```
*****
*                                     CTTSAM2                               *
*                                     *
*                                     *
* FUNCTION:  SAMPLE PROGRAM TO DEMONSTRATE ACCESS TO Control-M/TAPE *
*            MEDIA DATABASE (MDB) USING THE HIGH LEVEL API.          *
*            THIS PROGRAM READS THE MDB VOLUME RECORD OF A CERTAIN *
*            VOLUME, (IN THIS SAMPLE: V00001) AND ISSUES A MESSAGE *
*            ABOUT THE VOLUME'S STATUS: ACTIVE OR SCRATCH.          *
*            IN THIS CODE YOU WILL ALSO FIND AN EXAMPLE FOR AN *
*            MDB ERROR HANDLING ROUTINE THAT SHOULD BE CALLED BY *
*            ANY PROGRAM THAT USES THE HIGH LEVEL API.              *
*
* DD CARDS:  NONE (THE HIGH LEVEL API USES THE Control-M/TAPE REAL *
*              TIME ENVIRONMENT FILES).                               *
*
* DISCLAIMER: THIS SAMPLE PROGRAM IS PROVIDED ON AN AS IS BASIS, *
*             WITHOUT ANY WARRANTY, EITHER EXPRESS OR IMPLIED *
*
* REGISTERS: R13   - BASE   *
*            R4    - MDB VOLUME RECORD (MAPPED BY CTTDVL)          *
*            R9    - CTTACCDB PARMS (MAPPED BY CTTADBP)            *
*
* ATTRIBUTES: AMODE 31   *
*             RMODE 24   *
*
* TO COMPILE, LINK AND RUN THE PROGRAM :                             *
*
* //CTTSAM2 JOB ...  *
* //          JCLLIB ORDER=IOA.PROCLIB                <<<----- CHANGE *
* //          INCLUDE MEMBER=IOASET                    *
* //ASM       EXEC IOAASM                                       *
* //C.SYSIN   DD DISP=SHR,DSN=&ILPREF. . SAMPLE(CTTSAM2)          *
* //L.SYSLMOD DD DISP=SHR,DSN=YOUR.LOAD.LIBRARY    <<<----- CHANGE *
* //L.SYSIN   DD *   *
*             MODE RMODE(24),AMODE(31)                      *
*             ENTRY CTTSAM2                                   *
```

```

*      NAME CTTSAM2(R)
*      /*
*      //RUN EXEC PGM=CTTSAM2, COND=(0, NE), REGION=60M
*      //STEPLIB DD DISP=SHR, DSN=YOUR. LOAD. LIBRARY <<<----- CHANGE
*      //          DD DISP=SHR, DSN=&STEPLIB
*      //DARPTVOL DD SYSOUT=*
*      //DARPTDSN DD SYSOUT=*
*      //
*
*****

      EJECT ,
CTTSAM2  AMODE 31
CTTSAM2  RMODE 24
CTTSAM2  CSECT                      HIGH LEVEL API SAMPLE
      BEGIN *, EQR=YES
      SPACE 1
      LA    R9, ADBPARMS              R9->> CTTADB PARMS
      USING ADBP, R9
      XC    FLAG, FLAG                INIT INTERNAL FLAG
      SPACE 1

*****

*  PERFORM INITIALIZATION REQUIRED using using HIGH LEVEL API: START COMMAND *
*****

      SPACE 1
      CTTACDDB START, PARMS=ADBP ARMS      INITIALIZATION
      CTTCHKDB ERR=ADBERROR, PARMS=ADBP ARMS  CHECK START OPERATION
      SPACE 1
      OI    FLAG, $OPENED              MARK:  MDB IS OPENED
      SPACE 1

*****

*  READ MDB VOLUME RECORD OF VOLUME:  V00001 using using READVOL COMMAND *
*****

      SPACE 1
      MVC   VOL(6), =CL6' V00001'      VOLSER TO READ
      SPACE 1
      CTTACDDB READVOL, REC=VOLREC, VOL=VOL, PARMS=ADBP ARMS
      CTTCHKDB ERR=RVOLERR, PARMS=ADBP ARMS
      SPACE 1
      NI    FLAG, X' FF' - $OPENED      MARK:  MDB IS NOT OPENED
      SPACE 1

*****

*  PERFORM CLEANUP REQUIRED using HIGH LEVEL API:  END COMMAND *
*****

      SPACE 1

```



```

      CTTACDDB END, PARMS=ADBPARDS
      CTTCHKDB ERR=ADBERROR, PARMS=ADBPARDS
      SPACE 1
*****
*   ISSUE A MESSAGE ACCORDING TO VOLUME' S STATUS:  ACTIVE OR SCRATCH *
*****

      SPACE 1
      LA      R4, VOLREC              R4- >>MDB VOL RECORD
      USING DVL, R4
      TM      DVLSTAT, DVLSACT        AN ACTIVE VOLUME ?
      BNO     WTOSCR .. N,   GO ISSUE:  SCRATCH
      SPACE 1
      WTO     ' VOLUME V00001 IS ACTIVE'  VOLUME IS ACTIVE
      B       EXIT
      SPACE 1
WTOSCR     DS      OH                  VOLUME IS SCRATCH
      WTO     ' VOLUME V00001 IS SCRATCH'
      SPACE 1
      B       EXIT
      DROP    R4                      WAS MDB VOL RECORD
      SPACE 1
*****
*   MDB ERROR HANDLING ROUTINE - FOR READVOL FUNCTION *
*****

      SPACE 1
RVOLERR    DS      OH                  READVOL ERROR
      L       R15, ADBPRC              R15 - CTTADB RC
      C       R15, =F' 16'             A CTTIOS FAILURE ?
      BNE     ADBERROR .. N,   GO ISSUE ERROR MSG
      SPACE 1
      L       R15, ADBPIRC              R15 - RC OF CTTIOS
      C       R15, =F' 4'              VOLUME NOT FOUND ?
      BNE     ADBERROR .. N,   GO ISSUE ERROR MSG
      SPACE 1
      WTO     ' VOLUME V00001 NOT FOUND IN MEDIA DATABASE'
      SPACE 1
      NI      FLAG, X' FF' - $OPENED
      CTTACDDB END, PARMS=ADBPARDS      TRY TO PERFORM CLEANUP
      CTTCHKDB ERR=ADBERROR, PARMS=ADBPARDS
      SPACE 1
      B       EXIT                      NO OTHER UPDATES
      SPACE 1
*****
*   MDB ERROR HANDLING ROUTINE - FOR START/END FUNCTIONS *
*****

```

```

*****
ADBERROR DS      OH
          MVC     MSG1FUNC(8), ADBPFUNC      CTTACDDB FUNCTION FOR MESSAGE
          MVC     MSG1VOL(6), =CL6' V00001' VOLSER FOR MESSAGE
          L       R3, ADBPRC                  CONVERT
          CVD     R3, DW .. CTTACDDB
          UNPK    MSG1RC(3), DW+6(2) .. RETURN- CODE
          OI      MSG1RC+2, X' F0' .. FOR MESSAGE
          SPACE 1
          MVC     WT01+10(MSG1LEN), MSG1     MOVE MESSAGE TO BE WTO' ED
WT01      WTO     '                                     +
  ', ROUTCDE=11
          MVC     MSG2FUNC(8), ADBPIOPR      LAST CTTIOS FUNCTION FOR MSG
          L       R3, ADBPIRC                  CONVERT
          CVD     R3, DW .. LAST CTTIOS
          UNPK    MSG2RC(3), DW+6(2) .. RETURN- CODE
          OI      MSG2RC+2, X' F0' .. FOR MESSAGE
          SPACE 1
          L       R3, ADBPIRSN                  CONVERT
          CVD     R3, DW .. LAST CTTIOS
          UNPK    MSG2RSN(5), DW+5(3) .. REASON- CODE
          OI      MSG2RSN+4, X' F0' .. FOR MESSAGE
          SPACE 1
          MVC     WT02+10(MSG2LEN), MSG2     MOVE MESSAGE TO BE WTO' ED
WT02      WTO     '                                     +
  ', ROUTCDE=11
          SPACE 1
          B       EXIT
          SPACE 1
EXIT      DS      OH
          TM      FLAG, $OPENED              IS MDB STILL OPENED ?
          BNO     SKIPEND .. N,              SKIP END
          SPACE 1
          CTTACDDB END, PARMS=ADBPARMs
          SPACE 1
SKIPEND   DS      OH
          BRTRN 0
          SPACE 1
*****
*        WORK AREAS                                     *
*****
DW        DS      D                                DOUBLE WORD
*
FLAG      DS      X                                INTERNAL FLAG

```

```

$OPENED EQU X' 80' MARK: MDB IS OPENED
*
MSG1 DS OC 1ST ERROR MESSAGE
DC C' CTTACDB FUNCTION: '
MSG1FUNC DS CL8
DC C' FOR VOLUME: ' MSG1VOL DS CL6
DC C' FAILED. RC: '
MSG1RC DS CL3
MSG1LEN EQU *-MSG1
*
MSG2 DS OC 2ND ERROR MESSAGE
DC C' LAST CTTIOS FUNCTION: '
MSG2FUNC DS CL8
DC C' RC: '
MSG2RC DS CL3
DC C' REASON: '
MSG2RSN DS CL5
MSG2LEN EQU *-MSG2
*
VOL DS CL6 VOLUME SERIAL NUMEBR TO READ
VOLREC DS (DVLEN) X MDB RECORD BUFFER
*
ADBPAMS DS (ADBPLEN) X CTTACDB WORK PAMS
*****
* MAPPING DSECTS *
*****
CTTDBTP , CTTIOS PAMS
CTTADBP , CTTACDB PAMS
CTTDVL , MDB VOLUME RECORD MAP

END
Rule Search API

```

## Rule Search API

The Control-M/Tape Rule Search API is a powerful tool that can be used to determine what actions (DO statements) is triggered when a given set of selection criteria (specified using ON statements) is satisfied.

➤ To use the Control-M/Tape Rule Search API, perform the following steps:

1. Use the CTTGTCT macro to obtain the address of the Control-M/Tape Control Table (TCT) of the real-time Environment. For additional information, see [Obtaining the Address of the Real-Time TCT](#) (on page 669).
2. Specify desired selection criteria (that is, ON statements) using the RSO block. For more information, see [Input](#) (on page 700).

3. Call the Rule Search API with the necessary arguments specified.
4. Analyze the information returned by the Rule Search API in the RLM and RSI control blocks.

The Control-M/Tape Rule Search API searches only the rules currently in memory. If new rules were defined but are not yet loaded, refresh the Control-M/Tape rules before invoking the Rule Search API.

## Input

A set of selection criteria are specified for the Rule Search API using an RSO block. This block is passed to the API and is mapped by the CTTRSO dsect. For information on how to set the RSO block, see the CTTRSO dsect in the IOA MACRO library.

Below is an example of how information can be specified in an RSO block.

**Figure 95 Information Specified in an RSO Block**

|       |                                 |                             |
|-------|---------------------------------|-----------------------------|
|       | SPACE 1                         |                             |
|       | MVI MYRS0, C' '                 | Clear RSO block             |
|       | MVC MYRS0+1(L' MYRS0- 1), MYRS0 |                             |
|       | LA R3, MYRS0                    |                             |
|       | USING RS0, R3                   |                             |
|       | MVC RSODSN, MYDSN               | Specify ON DATASET criteria |
|       | MVC RS0VOL, MYVOL               | Specify ON VOLUME criteria  |
|       | DROP R3                         |                             |
|       | .                               |                             |
|       | .                               |                             |
| MYRS0 | DS XL(RSOLEN)                   |                             |
| MYDSN | DC CL44' MY. FILE'              |                             |
| MYVOL | DC CL6' VOL001'                 |                             |
|       | SPACE 1                         |                             |

The Rule Search API scans Control-M/Tape rules currently in memory, and determines which actions (DO statements) are invoked by the specified selection criteria. The Rule Search API needs the address of the Real-Time TCT in order to determine the address of the currently loaded rules in memory. The address of the Real-Time TCT must be included in the CALL statement used to invoke the Rule Search API.

Use the CTTGTCT macro to determine the address of the Real-Time TCT. For more information, see [Obtaining the Address of the Real-Time TCT](#) (on page 669).

## Output

The Rule Search API returns information in the following control blocks:

**Table 254 Control Blocks with Information from the Rule Search API**

| Block | Description                                                                                         |
|-------|-----------------------------------------------------------------------------------------------------|
| RLM   | Information about DO statements that are performed in response to the specified selection criteria. |

| Block | Description                                                                                                                                     |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| RSI   | Information about DO statements in control block RLM (for example, the rule name, table name and library in which each DO statement was found). |

The addresses for control blocks RLM and RSI are indicated as parameters in the CALL statement that is used to invoke the Rule Search API. For more information, see [Invoking the Rule Search API](#) (on page 702).

## RLM Control Block

The RLM control block is mapped by the CTTRLM dsect. Whereas an RLM control block is normally created for each Control-M/Tape rule in memory, the RLM control block created by the rule search API contains information about all DO statements that are triggered by selection criteria specified in the RSO block. For more information, see [Input](#) (on page 700).

This control block is composed of the following components:

- a rule header
 

This part of the control block normally contains rule-specific information (for example, rule mode).
- information about DO statements that can be assigned only one set of values (for example, DO STACK, DO POOL and DO LABEL)
- information about DO statements that can be assigned multiple sets of values (for example, DO VAULT or DO STKGROUP)
- information about DO statements that perform IOA functions (for example, DO FORCEJOB, DO SHOUT or DO CONDITION)

Each DO statement describing an IOA function is preceded by a one-byte number describing the length of the DO statement. This number can be used while extracting information from the RLM control block to move from the description of one DO statement to the description of the next DO statement.

For more information about the fields in the RLM control block, see the CTTRLM dsect in the Control-M/Tape MACRO library.

## RSI Control Block

The RSI control block contains information about each of the DO statements described in the RLM control block. For more information, see [RLM Control Block](#) (on page 701).

The following information is provided for each DO statement:

- the name of the rule containing the DO statement
- the name of the rule table
- the name of the library from which the rule table was loaded into memory
- the address of the RLM control block that describes the rule from which the information was extracted. This RLM control block is not the one created by the Rule Search API. This RLM block was created as part of the Control-M/Tape rule load process

For more information about the fields in the RSI control block, see the CTTRSI dsect in the IOA MACRO library.

## Invoking the Rule Search API

Use the following call statement to invoke the Control-M/Tape Rule Search API:

```
CALL CTTRSR, (func-addr, tct-address, rso-address, expdt, rlm-address, IOA-trace-header-address, rsi-address)
```

**Table 255 Fields for Invoking the Rule Search API**

| Field              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>func-addr</i>   | <p>The address of a function specification that indicates the action to be performed by the API. The address specified in this field points to a one-byte character that indicates the function to be performed by the API.</p> <p>You can specify the following function types:</p> <ul style="list-style-type: none"> <li>▪ R—Return only the DO statements that are triggered in response to the specified selection criteria. This function creates only an RLM control block. The RSI address (see field rsi-address in this table) need not be specified.</li> <li>▪ O—Return only the information about the rules triggered by the specified selection criteria. This function creates only an RSI control block.</li> <li>▪ I—Return the DO statements and rule information. This function creates both the RLM and RSI control blocks. For more information, see <a href="#">RLM Control Block</a> (on page 701) and <a href="#">RSI Control Block</a> (on page 701), respectively.</li> <li>▪ F—Free control blocks RLM and RSI (that were created by previous runs of the Rule Search API). This function must be specified in the last call to the API.</li> </ul> |
| <i>tct-address</i> | Address of the Real-Time TCT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>rso-address</i> | Address of the RSO block ( <a href="#">Input</a> (on page 700)) within the user program that is calling the Rule Search API.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Field                           | Description                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>expdt</i>                    | JCL EXPDT keyword to be associated with the specified selection criteria. If no keyword is needed, specify 0 for this argument in the CALL statement.      |
| <i>rlm-address</i>              | Address of a full-word in which to return the address of the RLM control block. For more information, see <a href="#">RSI Control Block</a> (on page 701). |
| <i>IOA-trace-header-address</i> | Address of IOA-trace-header, starting with MCT's MCTTRCHD.                                                                                                 |
| <i>rsi-address</i>              | Address of a full-word in which to return the address of the RSI control block. For more information, see <a href="#">RSI Control Block</a> (on page 701). |

### Sample Call to the Rule Search API

The following lines demonstrate a call to the Control-M/Tape Rule Search API:

**Figure 96 Sample Call to the Rule Search API**

|         |      |                                                           |
|---------|------|-----------------------------------------------------------|
|         | L    | R12, TCTADDR                                              |
|         | CALL | CTTRSR, (RSEARCH, (12), RSOLBK, 0, RLMADDR, (2), RSIADDR) |
|         | .    |                                                           |
|         | .    |                                                           |
|         | .    |                                                           |
| TCTADDR | DS   | A                                                         |
| RSEARCH | DC   | C' R'                                                     |
| RSOLBK  | DS   | XL(RSOLEN)                                                |
| RLMADDR | DS   | A                                                         |
| RSIADDR | DS   | A                                                         |

For a more detailed example, see [Sample Rule Search API](#) (on page 704).

### Return Codes

The Rule Search API returns one of the following return codes in general register 15:

**Table 256      Return Codes for the Rule Search API**

| Code | Description                                                                                          |
|------|------------------------------------------------------------------------------------------------------|
| 0    | The Rule Search API was successfully completed.                                                      |
| 4    | No Control-M/Tape rule currently in memory is triggered by the specified selection criteria.         |
| 8    | GETMAIN error.                                                                                       |
| 12   | Internal error.                                                                                      |
| 16   | FREEMAIN error.                                                                                      |
| 20   | An invalid argument was specified in the CALL statement that was used to invoke the Rule Search API. |

## Sample Rule Search API

The following sample program demonstrates usage of the Rule Search API. This sample includes commands that print the information in the RLM and RSI control blocks (that is, the DO statements and relevant descriptions).

This sample is located in the CTTSAM3 member in the IOA SAMPLE library.

**Figure 97      Sample Rule Search API**

```

*****
*
*                               CTTSAM3
*       Using Rule Search API - Sample
*
* -----
* FUNCTION: This sample program demonstrates the Rule Search API.
*           This program obtains a copy of the real-time environment
*           TCT, specifies two ON statements and calls the API.
*
*           Upon return from the API, the program searches the RLM
*           control block created by the API for DO STACK, DO VAULT
*           and DO CONDITION statements which are triggered by the
*           specified ON criteria. The DO statements that are
*           detected are then printed out.
*
* RETURN CODES:
*      00      OK
*      04      No matching rules were triggered or found
*      24      SYSPRINT file could not be opened
*      28      TCT could not be obtained. Control-M/TAPE is
*              probably not active
*      Other   Internal error in API (see documentation)
*

```



```

* LOGIC:      The following steps are performed by this sample program: *
*
*      1. Obtain a copy of the real-time environment TCT.
*
*      2. Specify ON DATASET and ON VOLUME criteria and call
*         the Rule Search API.
*
*      3. Search for D0 STACK, D0 VAULT and D0 CONDITION
*         statements in the RLM control block created by
*         the API, and print information about detected D0
*         statements.
*
*      4. If a D0 STACK statement was found in the previous
*         step, print the rule name, the table name, and the
*         library name in which the D0 STACK statement was
*         found.
*
* DD CARDS:   SYSPRINT - Output file
*
* DISCLAIMER: This sample is provided on an as-is basis, without any
*             warranty, either expressed or implied.
*
* REGISTERS:  R13   - Base
*             R12   - TCT address
*             R2    - SYSPRINT DCB address
*             R3:R7 - Work registers
*
* ATTRIBUTES: AMODE 31
*             RMODE 24
*
* TO COMPILE, LINK AND RUN THE PROGRAM :
*
* //CTTSAMP JOB ...
* //ASM EXEC IOAASM
* //          JCLLIB ORDER=IOA.PROCLIB          <<<- - - - - CHANGE
* //          INCLUDE MEMBER=IOASET
* //C. SYSIN   DD DISP=SHR, DSN=&ILPREF. . SAMPLE(CTTSAMB)
* //L. SYSLMOD DD DISP=SHR, DSN=YOUR. LOAD. LIBRARY <<<- - - - - CHANGE
* //L. AI OALOAD DD DISP=SHR, DSN=&ILPREF. . AI OALOAD
* //L. SYSIN   DD *
* INCLUDE AI OALOAD(CTTSR)
* INCLUDE AI OALOAD(IOADBG)
* INCLUDE AI OALOAD(IOAMVN)
* INCLUDE AI OALOAD(CTMXAGR)
* MODE AMODE(31), RMODE(24)
* ENTRY CTTSAMB
* NAME CTTSAMB(R)
* /*
* //RUN EXEC PGM=CTTSAMB, COND=(0, NE)
* //STEPLIB DD DISP=SHR, DSN=YOUR. LOAD. LIBRARY <<<- - - - - CHANGE
* //          DD DISP=SHR, DSN=&STEPLIB
* //SYSPRINT DD SYSOUT=*
* //
*
*****
CTTSAMB CSECT

```

```

CTTSAMB AMODE 31
CTTSAMB RMODE 24
        BEGIN  EQUR=YES
        CTTLEVEL CTTAPI, 1. 0. 0

*

        XC      RC, RC          Clear RC
        SPACE 1
*****
*  GET ADDRESS OF REAL-TIME ENVIRONMENT TCT                                *
*****
        SPACE 1
        CTTGTCT TCTADDR=ACTVTCT, TEST=ACT
        LTR     R15, R15          TCT loaded ?
        BNZ     TCTFAIL          N, exit
        SPACE 1
*****
*  BUILD 'ON' COMMANDS BLOCK  *
*****
        SPACE 1
        MVI     MYRS0, C' '      Clear RS0 block
        MVC     MYRS0+1(L' MYRS0-1), MYRS0
        LA      R3, MYRS0
        USING   RS0, R3
        MVC     RSODSN, MYDSN     Set 'ON DATASET' command
        MVC     RSOVOL, MYVOL     Set 'ON VOLUME' command
        DROP    R3
        SPACE 1
*****
*  CALL RULE SEARCH API  *
*****
        SPACE 1
        MVI     FUNCTYPE, C' I'   Extract 'D0' commands & rule info
        L       R12, ACTVTCT      TCT address
        USING   TCT, R12
        L       R2, TCTMCTA
        USING   MCT, R2
        LA      R2, MCTTRCHD      IOA trace header
        DROP    R2, R12           was MCT, TCT
        CALL    CTTRSRL (FUNCTYPE, (R12), MYRS0, EXPDT, DOOPT, (R2), STATUS, X
        RULEINFO), VL
        C       R15, =F' 4'      Any matching rules found ?
        BE      NOMATCH          No, exit
        BH      RSRFAIL          Rule search API failed ?
        SPACE 1
*****
*  OPEN SYSPRINT FILE  *
*****
        SPACE 1
        OPEN    (SYSPRINT, OUTPUT)
        LA      R2, SYSPRINT
        USING   IHADCB, R2
        TM      DCBOFLGS, DCBOFOPN  Successfully opened ?
        DROP    R2
        BNO     OPENFAIL
        SPACE 1
*****

```

```

* PRINT OUT THE TRIGGERED 'DO' Statements
*****

SPACE 1
BAL R14, PRTDO
SPACE 1

*****

* PRINT OUT THE INFORMATION ORIGIN
*****

SPACE 1
BAL R14, PRTINFO
SPACE 1

*****

* CLOSE SYSPRINT FILE
*****

SPACE 1
CLOSE SYSPRINT
SPACE 1

*****

* FREE RULE SEARCH API
*****

SPACE 1
MVI FUNCTYPE, C' F'          Free request
CALL CTTRSR, (FUNCTYPE, (R12), 0, 0, D0OPT, STATUS, RULEINFO), VL
LTR R15, R15                  RLM/RSI freed ?
BNZ RSRFAIL                   Rule search API failed ?
B RETURN                      Return
SPACE 1

*****

* CHECK SELECTED 'DO' COMMANDS AND PRINT THEM OUT
*****

SPACE 1
PRTDO EQU *
LR R11, R14                   Save return address

***

* Check 'DO' command (in fixed part of RLM)
***

L R3, D0OPT                   Get address of RLM block
USING RLM, R3
CLI RLMDPSTK, RLMDPSBL        'DO STACK' command is blank ?
BE CHKVLT                     Yes, go check 'DO VAULT'
MVC STACKVAL(1), RLMDPSTK
IOAMODE 24, R=R8
PUT SYSPRINT, STACK           PRINT 'DO STACK = X'
IOAMODE RESTORE, R=R8

***

* Check 'DO' command (in dynamic part of RLM)
***

CHKVLT EQU *
ICM R6, 15, RLMDV#VL          Any 'DO VAULT' commands ?
BZ CHKMORE                     No, go check other 'DO' commands
L R5, RLMDVADR                 Yes, get address of vaults block
VLTLOOP MVC VAULTNAM(L' RLMDVNAM), 0(R5)
IOAMODE 24, R=R8
PUT SYSPRINT, VAULT            Print 'DO VAULT = <vault-name>'
IOAMODE RESTORE, R=R8
LA R5, RLMDLVLT(R5)           Skip to next vaulting pattern

```

```

        BCT    R6, VLTLOOP
CHKMORE EQU    *
        ICM    R5, 15, RLMDOADR      Address of 'D0' block
        BZ     NOMORE
        L      R6, RLMD#IOA          No. of 'D0 <IOA-cmd>' commands
        DROP   R3
        USING  RLMRCRDS, R5
        L      R6, RLMD#IOA          No. of 'D0 <IOA-cmd>' commands
        XR     R7, R7
MOREDO  MVI    IOACMDV, C' '          Clear output record
        MVC    IOACMDV+1(L' IOACMDV-1), IOACMDV
        CLI    RLMDTYPE, RLMDCOND    Is it a 'D0 CONDITION' command ?
        BNE    SKIPNXT               No, skip to next 'D0' command
        MVC    IOACMDV(L' RLMDCCND), RLMDCCND
        IOAMODE 24, R=R8
        PUT    SYSPRINT, IOACMD      Print the 'D0' command
        IOAMODE RESTORE, R=R8
        ICM    R7, B'0001', RLMRLCRD Length of the 'D0' command
SKIPNXT AR     R5, R7                 Skip to next command
        BCT    R6, MOREDO
        DROP   R5
NOMORE  EQU    *
        BR     R11
        SPACE 1
*****
*   PRINT OUT THE INFORMATION ORIGIN   *
*****
        SPACE 1
PRTINFO EQU    *
        LR     R11, R14              Save return address
        CLI    STACKVAL, C' '        D0 STACK command retrieved ?
        BE     NOSTACK               No, don't print its origin
***
*   Print information about the origin of the 'D0 STACK' command
***
        L      R3, RULEINFO          Get address of RSI block
        USING  RSI, R3
        MVC    RULENAME(L' RSISRLNM), RSISRLNM
        LA     R4, RULENAM
        IOAMODE 24, R=R8
        PUT    SYSPRINT, (R4)        Print the rule name
        IOAMODE RESTORE, R=R8
        MVC    RULETAB(L' RSISTBNM), RSISTBNM
        LA     R4, RULETAB
        IOAMODE 24, R=R8
        PUT    SYSPRINT, (R4)        Print the rule table
        IOAMODE RESTORE, R=R8
        MVC    RULELIBR(L' RSISTBLB), RSISTBLB
        LA     R4, RULELIB
        IOAMODE 24, R=R8
        PUT    SYSPRINT, (R4)        Print the rule library
        IOAMODE RESTORE, R=R8
NOSTACK EQU    *
        BR     R11
        SPACE 1
*****

```

```

SPACE 1
NOMATCH EQU *           No rule was triggered
        MVI  FUNCTYPE,C' F'      Free request
        CALL CTTRSR, (FUNCTYPE, (R12), 0, 0, D0OPT, STATUS, RULEINFO), VL
        LA   R15, RC4
        ST   R15, RC
        B    RETURN

*
OPENFAIL EQU *           SYSPRINT Open failed
        MVI  FUNCTYPE,C' F'      Free request
        CALL CTTRSR, (FUNCTYPE, (R12), 0, 0, D0OPT, STATUS, RULEINFO), VL
        LA   R15, RC24
        ST   R15, RC
        B    RETURN

*
TCTFAIL EQU *           TCT could not be obtained
        LA   R15, RC28
        ST   R15, RC
        B    RETURN

*
RSRFAIL EQU *           Rule search API has failed
        ST   R15, RC
        B    RETURN

*
RETURN  L    R15, RC           Return to caller
        BRTRN (15)

*-----*
        LTORG
        EJECT

*-----*
*   COMMON BLOCK AREA   *
*-----*

COMBLOCK DS    OD
*
*   Constants
*
RC4      EQU    4
RC24     EQU    24
RC28     EQU    28
*
RC        DS    F              Routine's return code
ACTVTCT  DS    A              TCT address
MYDSN    DC    CL44' N89. CHKIN. TRY'
MYVOL    DC    CL6' CHKIN0'
DOSTKFND DS    C              DO STACK command found ? (Y/N)
*-----*
FUNCTYPE DS    C              Function type
MYRS0    DS    XL(RSOLEN)     'ON' statements
D0OPT     DC    A(0)           Address of RLM block
RULEINFO  DC    A(0)           Address of RSI block
EXPDT     DC    F' 0'         JCL expdt
STATUS    DC    X' 00'        Status flag
*-----*
SYSPRINT DCB DDNAME=SYSPRINT, DSORG=PS, MACRF=PM, RECFM=FB, LRECL=121
*-----*
IOACMD    DC    CL14' DO CONDITION: '

```

```

IOACMDV DS CL107' '
STACK DC CL11'DO STACK = '
STACKVAL DS CL110
VAULT DC CL11'DO VAULT = '
VAULTNAM DS CL110
RULENAM DC CL37'DO STACK command taken from rule: '
RULENAME DS CL84
RULETAB DC CL37' from table: '
RULETABL DS CL84
RULELIB DC CL37' from library: '
RULELIBR DS CL84
*-----*
EJECT
IEFJSCVT Macros for CTTGTCT
IEFJESCT
COPY CTTSSVT
CVT CVT DSECT=YES, PREFIX=YES
TCT DSECT
COPY CTTTCT TCT layout
MCT DSECT
COPY IOAMCT MCT layout
*-----*
EJECT
RSO DSECT 'ON' statements
COPY CTTRS0
RLM DSECT 'DO' statements
COPY CTTRLM
RSI DSECT Rules information
COPY CTTRSI
RLD DSECT Equates for CTTRLM
COPY CTTRLD
RLX DSECT Equates for CTTRLM
COPY CTTRLX
DCBD DSORG=PS
*-----*
END

```

# IOAGATE

## Overview

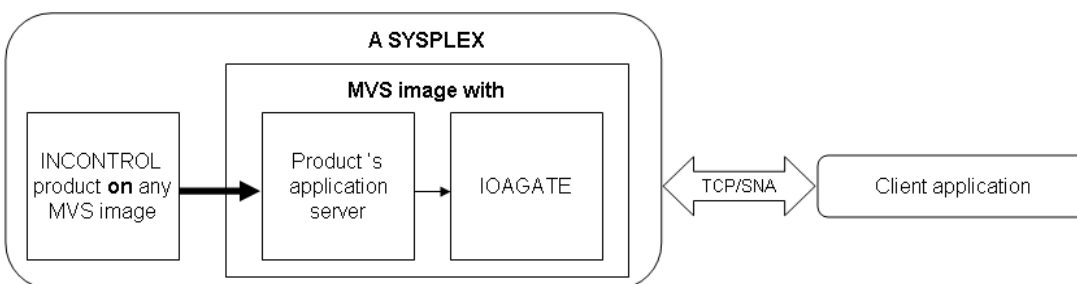
This chapter contains a brief overview of the IOAGATE and its components, followed by the parameters and commands that an administrator needs to operate IOAGATE.

IOAGATE is a mainframe software communications gateway (middleware) that enables INCONTROL mainframe applications to communicate with other mainframe and non-mainframe applications over the network.

Client applications access INCONTROL products by means of an application server through IOAGATE.

The following figure shows IOAGATE components:

**Figure 98 IOAGATE Components**



IOAGATE supports multiple concurrent application servers of different applications and their clients. A single IOAGATE can support Control-M, Control-D/Page On Demand, Control-D File Transfer option, and Control-O applications.

Note: BMC recommends that you read the detailed explanation of all aspects of IOAGATE installation and configuration that is provided in "IOAGATE Installation and Configuration Considerations", in the *INCONTROL for z/OS Installation Guide: Installing*.

## IOAGATE EXEC Parameters

This section describes the startup EXEC parameters in the IOAGATE STC job or in the start command that are used to alter IOAGATE behavior.

## TRACE

### Purpose

Handling of IOAGATE traces.

## Syntax

**Table 257 Syntax for Parameter TRACE**

| Syntax             | Description                     |
|--------------------|---------------------------------|
| TRACE=<trace list> | Samples of trace list formats:  |
| TRACE=20           | Turn ON trace level 20          |
| TRACE=(21,200)     | Turn ON trace levels 21 AND 200 |
| TRACE=-200         | Turn OFF trace levels 200       |
| TRACE=(-21,-40)    | Turn OFF trace levels 21 AND 40 |
| TRACE=(1:512)      | Turn ON all trace levels        |
| TRACE=(-1:-512)    | Turn OFF all trace levels       |
| TRACE=SHOW         | Show current trace levels       |

For example, to set TRACE parameter to 'SHOW' and PSFX parameter to 'W', do one of the following:

- In an STC Job, enter the following commands:

```
//IOAGATE JOB MSGLEVEL=1
//          JCLLIB  ORDER=IOAP. V610. PROCLIB
//          INCLUDE MEMBER=IOASET
//IOAGATE EXEC IOAGATE,
//          REG=OM,
//          TRACE=SHOW,
//          PSFX=W
```

- In a start command, enter the following:

```
/S IOAGATE,TRACE=SHOW,PSFX=W
```

Start command EXEC parameters overrides the STC job parameters.



## PSFX

### Purpose

Defines the parameter member (ECAPARM) suffix.

If this parameter is omitted, member ECAPARM is loaded.

For example, PSFX=D causes IOAGATE to load the ECAPARMD member.

### Syntax

PSFX=#

where # is any valid character for the member name suffix.

## Overriding Channel Definitions

The user can override link definitions of a selected channel using the EXEC parameters described in the following topics.

## CHAN

### Purpose

Identify the channel that is to be affected by the PORT or APPLID parameters.

If this parameter is omitted, the first channel in member ECAPARMx is affected.

User must provide the PORT or APPLID parameters to match the channel protocol (TCP/SNA).

### Syntax

CHAN=xx

where xx is the Channel ID (defined in member ECAPARMx under the CHANNEL entry).

### Description

If CHAN is not defined in member ECAPARMx, the PORT/APPLID is ignored.

## PORT

### Purpose

Alter the TCP/IP port defined for a channel. The channel ID is specified by the CHAN parameter.

## Syntax

PORT=*nnnnn*

where *nnnnn* is a number between 1024 and 65534.

## APPLID

### Purpose

Alter the SNA LUs defined for a channel. The channel ID is specified by the CHAN parameter.

## Syntax

**Table 258 Syntax for APPLID Parameter**

| Statement                          | Description                                             |
|------------------------------------|---------------------------------------------------------|
| APPLID=< <i>luname</i> >           | Single LU name for multi-connection channel.            |
| APPLIDS=( <i>luname1,luname2</i> ) | Two LUs (Send and Receive) for Dual-connection channel. |

where *luname*, *luname1* and *luname2* are valid SNA lu names.

## IOAGATE Modify Commands

The following modify commands are available to the IOAGATE operator. These commands enable the operator to diagnose the IOAGATE and applications server address space status. The operator can then execute commands such as starting and stopping components.

## IDL

### Purpose

The IDL modify command passes on the command specified as a parameter, to the IDL facility for processing. For more information, refer to [Modify commands](#) (on page 182).

## Syntax

```
F IOAGATE,IDL= <modify command>
```

## Example

```
IOAL00I IDL FACILITY RECEIVED REQUEST(REFRSUMMARY)
IOAL2ZI SUMMARY TABLE HAS BEEN REFRESHED SUCCESSFULLY,
ADDRESS(175F3000)
IOAL0RI IDL REQUEST(REFRSUMMARY) PROCESSED SUCCESSFULLY, 000.03 sec
```

## SVCDUMP

### Purpose

Initiates an SVC dump.

### Syntax

```
F IOAGATE,SVCDUMP
```

## Example

```
ECAGOAI MODIFY COMMAND ISSUED FROM CONSOLE(console id)

SVCDUMP request has been performed
ECAGOAI MODIFY COMMAND ISSUED FROM CONSOLE(N03)
ACCEPTCOMMAND(SVCDUMP)
IEA794I SVC DUMP HAS CAPTURED:
DUMPID=009 REQUESTED BY JOB (started task)
SVCDUMP request has been performed
```

## TRACE

### Synonyms

DEBUG

### Purpose

Handling IOAGATE traces. Trace data is written to the DATRACE DD statement.

## Syntax

To start or stop trace levels

```
F IOAGATE,TRACE=<trace list>
```

To show trace level status

```
F IOAGATE,TRACE=SHOW
```

**Table 259**      **Samples of Trace List Formats**

| Statement       | Description                     |
|-----------------|---------------------------------|
| TRACE=20        | Turn ON trace level 20          |
| TRACE=(21,200)  | Turn ON trace levels 21 AND 200 |
| TRACE=-200      | Turn OFF trace levels 200       |
| TRACE=(-21,-40) | Turn OFF trace levels 21 AND 40 |
| TRACE=(1:512)   | Turn ON all trace levels        |
| TRACE=(-1:-512) | Turn OFF all trace levels       |

## Examples

### Example 1

```
F IOAGATE,TRACE=(120,-20)
```

This command produces the following output (JESMSGGLG):

```
IOAD01I TRACE/DEBUG LEVELS SET AS FOLLOWS:
IOAD02I 0120 - TURNED ON
IOAD02I 0020 - TURNED OFF
```

### Example 2

```
F IOAGATE,TRACE=SHOW
```

This command produces the following output (JESMSGGLG):

IOAD03I PRESENT TRACE/DEBUG LEVELS ARE AS FOLLOWS:

IOAD04I 0001:0019 - OFF

IOAD04I 0020 - ON

IOAD04I 0021:0512 - OFF

**Table 260 Subset of IOAGATE Trace Levels**

| Trace Level | Trace Output                                                                                                                                                         |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20          | Communications general trace                                                                                                                                         |
| 21          | Send or Receive buffers                                                                                                                                              |
|             | If data compression is enabled in the application server, the send buffer of that server is printed in compressed format. Use level 23 to display uncompressed data. |
| 22          | Send or Receive message header summary                                                                                                                               |
| 23          | Send or Receive uncompressed buffers                                                                                                                                 |
|             | Disables data compression for all application servers while ON.                                                                                                      |
| 40          | SNA communication trace                                                                                                                                              |
| 150         | Application server management trace.                                                                                                                                 |
|             | This modify TRACE command must be issued for the application server address space and not on the IOAGATE address space.                                              |
| 200         | TCP/IP communication modules trace                                                                                                                                   |

## STATUS

### Synonyms

SHOWASID

STATASID

ASID

### Purpose

Display application server task status.

## Syntax

To list all application servers tasks

---

```
F IOAGATE,STATUS
```

---

To list tasks of a specific application server address space

---

```
F IOAGATE,STATUS=<ASID>
```

---

where *ASID* is the application server ID. The application server ID is the sequence number of the address space at IOAGATE startup.

## Sample Output

---

```
F IOAGATE,STATUS
```

---

This command lists the server tasks of IOAGATE and produces the following output (JESMSGGLG):

|         |                |             |               |           |            |             |
|---------|----------------|-------------|---------------|-----------|------------|-------------|
| ECAG0AI | MODIFY(STATUS) | ACCEPTED    |               |           |            |             |
| ECAG34I | SERVER TASK    | S T A T U S | CHANNEL/SI ID | PROCEDURE | STC/MODULE | UTILIZATION |
| ECAG35I | CM 0001. 01    | READY       | MCC1          | H50AS     | H50AS001   | 0. 0%       |
| ECAG35I | CS 0002. 01    | READY       | MCC1          |           | CTOGATS    | 0. 0%       |
| ECAG35I | CD 0003. 01    | READY       | MCC1          |           | CTOGATR    | 0. 0%       |
| ECAG34I | SERVER TASK    | S T A T U S | CHANNEL/SI ID | PROCEDURE | STC/MODULE | UTILIZATION |
| ECAG35I | CM M007. 03    | READY       | DCC3          | H5MAS     | H5MAS003   | 0. 0%       |
| ECAG35I | CS M008. 03    | READY       | DCC3          |           | CTWSRVR    | 0. 0%       |
| ECAG35I | CD M009. 03    | UP          | DCC3          |           | CTWDET     | 0. 0%       |
| ECAG35I | CU M010. 03    | READY       | DCC3          |           | CTWUPD     | 0. 0%       |
| ECAG34I | SERVER TASK    | S T A T U S | CHANNEL/SI ID | PROCEDURE | STC/MODULE | UTILIZATION |
| ECAG35I | CM D011. 04    | READY       | MCC4          | H5AAS     | H5AAS004   | 0. 0%       |
| ECAG35I | CS D012. 04    | READY       | MCC4          |           | I0AASR     | 0. 0%       |
| ECAG35I | CS D013. 04    | READY       | MCC4          |           | I0AASR     | 0. 0%       |
| ECAG35I | CS D014. 04    | READY       | MCC4          |           | I0AASR     | 0. 0%       |
| ECAG35I | CS D015. 04    | READY       | MCC4          |           | I0AASR     | 0. 0%       |
| ECAG35I | CS D016. 04    | READY       | MCC4          |           | I0AASR     | 0. 0%       |
| ECAG35I | CS D017. 04    | READY       | MCC4          |           | I0AASR     | 0. 0%       |
| ECAG35I | CS D018. 04    | READY       | MCC4          |           | I0AASR     | 0. 0%       |
| ECAG35I | CS D019. 04    | READY       | MCC4          |           | I0AASR     | 0. 0%       |
| ECAG35I | CS D020. 04    | READY       | MCC4          |           | I0AASR     | 0. 0%       |
| ECAG35I | CS D021. 04    | READY       | MCC4          |           | I0AASR     | 0. 0%       |
| ECAG35I | CD D022. 04    | READY       | MCC4          |           | I0AASC     | 0. 0%       |

Table 261 Description of Output Fields

| Output Field | Description                                                                                                                                                        |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SERVER       | Server type.                                                                                                                                                       |
| TASK         | Task identification specified in the format <i>snnn.mm</i> .<br><i>s</i> - Short application code<br><i>nnn</i> - Unique Server ID<br><i>mm</i> - Address space ID |

| Output Field             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STATUS                   | <p>Server current working status. Possible statuses are:</p> <ul style="list-style-type: none"> <li>▪ READY - Server ready to receive requests.</li> <li>▪ BUSY - Server is busy handling a transaction.</li> <li>▪ START - Server is in starting process.</li> <li>▪ UP - Server is up (server without mailbox).</li> <li>▪ FAILED - Server failed.</li> <li>▪ DOWN - Server is down.</li> <li>▪ SUSPEND - Server recovery was suspended.</li> <li>▪ WAIT - Server is waiting for main task (CM) readiness.</li> <li>▪ PENDING - Server is not responsive.</li> </ul> |
| CHANNEL/SIID             | <p>For a non-busy task, this field displays the channel name in the format TTNN, where TT is the channel type (DC/MC) and NN is the channel ID. For busy tasks, this field displays the current serviced instance ID</p>                                                                                                                                                                                                                                                                                                                                               |
| PROCEDURE.<br>STC/MODULE | <p>For a CM task, this field displays the procedure name of the application server in the format <i>XXXXXFMM</i>.</p> <p><i>XXXXX</i> - Procedure prefix name.</p> <p><i>F</i> - ECAPARM suffix name.</p> <p><i>MM</i> - Address space ID.</p> <p>For other tasks, this field displays the server program name</p>                                                                                                                                                                                                                                                     |
| UTILIZATION              | The server service handling utilization                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

For details, see messages ECAG34I and ECAG35I in the *INCONTROL for z/OS Messages Manual*.

## SHOWCHAN

### Synonyms

CHAN

### Purpose

Display channels status.



## Syntax

To list all channels

```
F IOAGATE,SHOWCHAN
```

To list only enabled channels

```
F IOAGATE,SHOWCHAN,E
```

## Output Examples

```
F IOAGATE,CHAN
```

Output (JESMSGGLG):

| ECAA0AI | CHAN | PROT | TASK | VENDOR | SUBS | PORT/LU | STATUS | LINKS | APPL |
|---------|------|------|------|--------|------|---------|--------|-------|------|
| ECAA0BI | DCM2 | TCP  | SNDR | IBM    | -    | 26410   | DOWN   | -     | M    |
| ECAA0BI | DCM2 | TCP  | RCVR | IBM    | -    | 26411   | DOWN   | -     | M    |

| ECAA0AI | CHAN | PROT | TASK | VENDOR | SUBS | PORT/LU  | STATUS   | LINKS | APPL |
|---------|------|------|------|--------|------|----------|----------|-------|------|
| ECAA0BI | MCD0 | SNA  |      | IBM    | -    | PODLU01D | DISABLED | -     |      |
| ECAA0BI | MCD1 | TCP  | LSNR | IBM    | -    | 7910     | UP/OPEN  | 0     | D    |
| ECAA0BI | MCF1 | TCP  | LSNR | IBM    | -    | 7990     | UP/OPEN  | 0     | F    |
| ECAA0BI | MCX2 | TCP  |      | IBM    | -    | 7910     | DISABLED | -     |      |

**Table 262 Description of Output Fields**

| Header  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CHAN    | Channel in the format TTNN, where TT is the channel type (DC/MC) and NN is the channel ID.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| PROT    | Channel protocol. Valid values are SNA and TCP, for SNA protocols and TCP/IP protocols, respectively.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| TASK    | Channel Task identity. Valid values are SNDR (Sender) or RCVR (Receiver) for DC Channel, and LSNR for MC channel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| VENDOR  | TCP/IP vendor. Valid values are IBM and CA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| SUBS    | Sub-system name. Valid only for vendor CA and protocol TCP/IP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| PORT/LU | Port / LU defined to the channel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| STATUS  | Channel current status. Possible values are: <ul style="list-style-type: none"> <li>DISABLED – Channel is disabled for use.</li> <li>LISTENING – Channel is listening for connections. Displayed for DC channel.</li> <li>CONNECTED – Channel is connected. Displayed for DC channel.</li> <li>UP/OPEN – Channel communication is open for incoming connections. Displayed for MC channel.</li> <li>UP/CLOSED – Channel communication is UP but unavailable (CLOSED) for incoming connections. Displayed for MC channel.</li> <li>DOWN – Channel communication is down.</li> </ul> |
| LINKS   | Current number of connections to the channel (TCP/IP only).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| APPL    | Applications (in short name format) supported by this channel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## SHOWTOKEN

### Purpose

Displays IOAGATE MVS token

### Syntax

To show IOAGATE MVS tokens, enter the following:

---

```
F IOAGATE,SHOWTOKEN
```

---

The contents of the current IOAGATE token are displayed in a ECAG3HI message.

### Output Examples

---

```
F IOAGATE,SHOWTOKEN
```

---

Output (JESMSG LG):

---

```
ECAGOAI MODIFY COMMAND ISSUED FROM CONSOLE(N03)      ACCEPTED, COMMAND(SHOWTOKEN)
ECAG3HI IOAGATE Token: Name=<MVS token name>  LX=<Linkage Index>  Obtained=<Date LX was
obtained> System=<systemname>
```

---

## STARTASID

### Synonyms

SASID

### Purpose

Start application server address space.

The command can be issued after the application server was shut down due to operator command STOPASID or address space failure.

### Syntax

---

```
F IOAGATE,STARTASID=<ASID>
```

---

where *ASID* is the application server address space ID.

## Description

The ID is the sequence number of the address space that has been assigned by IOAGATE at startup. This number is the suffix of the application server procedure step. You can find it by using the STATUS command, and in message ECAB50I (in DD DAIGLOG). For example, the ASID 01 startup message:

---

```
ECAB50I  APPL.SERVER(CONTROLW.01.A60AS.A60ASW01-MCM1)  STARTED  SUCCESSFULLY
```

---

## Output Example

---

```
F IOAGATE, STARTASID=01
```

---

This command produces the following output (DAIGLOG):

---

```
ECAG47I  START FOR APPLICATION SERVER(CONTROLW.01)  INITIATED
ECAB50I  APPL. SERVER(CONTROLW.01.A60AS.A60ASW01-MCM1)          STARTED  SUCCESSFULLY
```

---

## STOPASID

### Synonyms

PASID

### Purpose

Stop an application server address space.

### Syntax

```
F IOAGATE, STOPASID=<ASID>
```

where *ASID* is the application server address space ID.

## Description

The ID is the sequence number of the address space that has been assigned by IOAGATE at startup. This number is the suffix of the application server procedure step. You can find it by using the STATUS command, and in message ECAB50I (in DD DAIGLOG). For example, the ASID 01 startup message:

---

```
ECAB50I  APPL.SERVER(CONTROLW.01.A60AS.A60ASW01-MCM1)  STARTED  SUCCESSFULLY
```

---

## Output Example

```
F IOAGATE,STOPASID=01
```

This command produces the following output (DAIGLOG):

```
ECAG37I STOP FOR APPL.SERVER(CONTROLW.01) INITIATED
```

## STARTTID

### Synonyms

STID

### Purpose

Start server task under an application server address space.

### Syntax

```
F IOAGATE,STARTTID=<Task ID>
```

**Table 263 Syntax for Command STARTID**

| Field          | Description                                                                                                                   |
|----------------|-------------------------------------------------------------------------------------------------------------------------------|
| <i>Task ID</i> | Unique ID of the server task in the format <i>snnn</i> .<br><i>s</i> - Short application code.<br><i>nnn</i> - Server number. |

### Description

You can find the server task ID by using the STATUS command, and in the messages ECAB27I, ECAB49I, ECAG4DE and ECAG41E.

```
ECAB27I START FOR SERVER TASK(CD.M003.01) INITIATED
ECAB49I SERVER TASK(CONTROLM CS.M002.01) STARTED SUCCESSFULLY
ECAG4DE SERVER TASK(CONTROLM CM.M001.01) FAILED
ECAG41E SERVER TASK(CONTROLM CS.M002.01) FAILED WHEN HANDLING A REQUEST,
USER(GATEWAY ) SIID(185233003)
```

## STOPTID

### Synonyms

PTID

### Purpose

Stop server task under an application server address space.

Stopping a task can cause the application server address space to shut down.

### Syntax

```
F IOAGATE,STOPTID=<Task ID>
```

### Description

**Table 264 Syntax for Command STOPTID**

| Field   | Description                                                                                                                   |
|---------|-------------------------------------------------------------------------------------------------------------------------------|
| Task ID | Unique ID of the server task in the format <i>snnn</i> .<br><i>s</i> - Short application code.<br><i>nnn</i> - Server number. |

You can find the server task ID by using the STATUS command, and in the messages ECAB27I, ECAB49I, ECAG4DE and ECAG41E.

```
ECAB27I START FOR SERVER TASK(CD.M003.01) INITIATED
ECAB49I SERVER TASK(CONTROLM CS.M002.01) STARTED SUCCESSFULLY
ECAG4DE SERVER TASK(CONTROLM CM M001.01) FAILED
ECAG41E SERVER TASK(CONTROLM CS.M002.01) FAILED WHEN HANDLING A REQUEST, USER(GATEWAY
) SIID(185233003)
```

### Output Example

```
F IOAGATE,STOPTID=D003
```

This command produces the following output (DAIGLOG):

```
ECAG4AI STOP FOR SERVER TASK(CONTROLD. CS. D003.01) INITIATED
ECAG4GI SERVER TASK(CONTROLD. CS. D003.01) HAS BEEN STOPPED BY OPERATOR
```

## MODASID

### Synonyms

FASID

### Purpose

Send a modify command to an application server that can receive and perform such a command.

### Syntax

To send a command to all application servers that can receive modify commands:

```
F IOAGATE,MODASID,<command>
```

To send a command to a specific address space that can receive modify commands

```
F IOAGATE,MODASID=<ASID>,<command>
```

**Table 265 Syntax for Command MODASID**

| Field   | Description                           |
|---------|---------------------------------------|
| ASID    | Application server address space ID.  |
| Command | Application server supported command. |

### Description

For the detailed commands supported by the application server, see the application documentation.

### Sample Output

```
F IOAGATE,MODASID=02,LOADTREE
```

This command produces the following output (DAIGLOG):

```
ECAE52I MODIFY FOR SERVER(CONTROLD.CD.D003.01) SUBMITTED
```

## STOP

### Purpose

Stop IOAGATE and all its application servers.

### Syntax

---

```
F IOAGATE,STOP
```

---

### Output

---

```
ECAG07I SHUT DOWN UPON REQUEST FROM OPERATOR
```

---

## SHOWMAP

### Synonyms

MAP

### Purpose

List the map used by the Control-O Gateway to Gateway connections.

### Syntax

```
F IOAGATE,SHOWMAP
```



## Sample Output (JESMSGGLG)

|         |                    |         |             |                        |            |               |
|---------|--------------------|---------|-------------|------------------------|------------|---------------|
| ECAP20I | IOAGATE-T0-IOAGATE | TCP     | CONNECTIONS | NODE=R5NODE            | MAP=TCPMAP | APPL=Control0 |
| ECAP23I | CHAN               | TASK    | PARTNER     | PORT                   | CONNECTOR  | S T A T U S   |
| ECAP24I | -----              | -----   | -----       | -----                  | -----      | -----         |
| ECAP24I | MCC1               | Y2KNODE | PARTNER     | WAITING FOR CONNECTION |            |               |

**Table 266 Description of Output Fields**

| Header    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CHAN      | Channel in format MCID, where MC is the type and ID is the channel ID                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| TASK      | ID of the communication task that handles the connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| PARTNER   | NODE of the partner IOAGATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| PORT      | Port of the partner IOAGATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| CONNECTOR | LOCAL or PARTNER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| STATUS    | Statuses are: <ul style="list-style-type: none"> <li>▪ READY TO CONNECT - Temporary initial status</li> <li>▪ RECONNECTED - Connection established after it has been lost</li> <li>▪ DISCONNECTED - Passive side lost connection</li> <li>▪ DISABLED - Invalid MAP entry disabled</li> <li>▪ CONNECTION IN PROGRESS - Connect in progress</li> <li>▪ RETRYING - Connect failed and will be retried</li> <li>▪ CONNECTED - Connection established</li> <li>▪ WAITING FOR CONNECTION - Passive side awaiting connection</li> </ul> |
| SOCKET    | Socket number used for the connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| HOST      | Hostname or IP address where partner IOAGATE runs as defined in MAP                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

For more details see messages ECAP20I, ECAP21I and ECAP22I in the *INCONTROL for z/OS Messages Manual*.

## ALLOCS

## Purpose

List all address space allocated files.

## Syntax

```
F IOAGATE,ALLOCS
```

## Sample Output

### Output (JESMSGLG):

```
IOA000I LIST OF ALLOCATED DDNAMES :
IOA000I STEPLIB JCL IOAP.V900.TLOAD
IOA000I DAPARM JCL IOAP.V900.PARM
IOA000I DAMAP JCL IOAP.V900.PARM
IOA000I ECACOPRM JCL IOAP.CTMS.GTWPARM
IOA000I ECATMSG JCL IOAP.V900.MSGENG
IOA000I DAMSG DYN IOAP.V900.MSGENG
```

**Table 267 Description of Output Fields**

| Header | Description             |
|--------|-------------------------|
| DYN    | Dynamic allocated file. |
| JCL    | Static allocated file.  |

## STORSUM

### Purpose

Print virtual storage summary.

## Syntax

```
F IOAGATE,STORSUM
```

## Sample Output

**Figure 99 Sample Output DAPRENV**

|                                                       |          |    |     |       |       |          |                   |
|-------------------------------------------------------|----------|----|-----|-------|-------|----------|-------------------|
| IOA000I STORAGE MAP BY TCB, STORAGE KEY AND SUBPOOL : |          |    |     |       |       |          |                   |
| IOA000I                                               | 009FE240 | 01 | 229 | ALLOC | TOTAL | 00003000 | 00000000 00003000 |
| IOA000I                                               |          |    |     | FREE  | TOTAL | 00000000 |                   |
| IOA000I                                               | 009FE240 | 05 | 229 | ALLOC | TOTAL | 00019000 | 00000000 00019000 |
| IOA000I                                               |          |    |     | FREE  | TOTAL | 00000000 |                   |
| IOA000I                                               | 009FE240 | 00 | 230 | ALLOC | TOTAL | 00007000 | 00003000 00004000 |
| IOA000I                                               |          |    |     | FREE  | TOTAL | 000021B0 |                   |
| IOA000I                                               | 009FE240 | 01 | 230 | ALLOC | TOTAL | 0000A000 | 00004000 00006000 |
| IOA000I                                               |          |    |     | FREE  | TOTAL | 00001A58 |                   |

## SHOWSIBS

### Synonyms

SIBS

### Purpose

Print the total number of Service Instance Control Blocks in IOAGATE queues.

These blocks represent the messages held in IOAGATE.

### Syntax

```
F IOAGATE,SHOWSIBS
```

### Sample Output (in JESMSG LG)

```
THERE ARE 00012 ACTIVE SIBS IN THIS CO-GATEWAY
```

## STATON

### Purpose

Start the IOAGATE communication statistics collection.

## Syntax

```
F IOAGATE,STATON,INTERVAL=nnn
```

where *nnn* is the time interval (a number from 001 through 999).

## Description

If the time interval is omitted, the interval is set to 10 minutes. The time interval is the time between each storing of the collected communications statistics data. Only data for the last six time intervals are saved.

## Output (DAIGLOG)

```
ECAB60I STATISTICS COLLECTION STARTED. INTERVAL IS 10 MINUTES
```

## STATOFF

### Purpose

Stop IOAGATE communication statistics collection.

## Syntax

```
F IOAGATE,STATOFF
```

## Output (DAIGLOG)

```
ECAB61I STATISTICS COLLECTION STOPPED
```

## STATRESET

### Purpose

Reset communication statistics.

## Syntax

---

```
F IOAGATE,STATRESET
```

---

## Output (DAIGLOG)

---

```
ECAB62I STATISTICS DATA WAS RESET
```

---

## STATALL

### Purpose

Print detailed statistics data.

(Table line levels are: Time interval, Channel, Application, and Message type level).

## Syntax

---

```
F IOAGATE,STATALL
```

---

## Output (DATRACE)

**Figure 100 Sample Output (DATRACE)**

| #===== . . .#                                                        |      |      |              |           |         |          |         |   |   |
|----------------------------------------------------------------------|------|------|--------------|-----------|---------|----------|---------|---|---|
|                                                                      |      |      |              | # Total   | 1       | 2        | 3       |   |   |
| Chan                                                                 | Appl | TRAN | Data         | # 11: 28  | 13: 28- | 13: 38-  | 13: 48- |   |   |
| ID                                                                   | Name | ID   | Type         | # 14: 25  | 13: 38  | 13: 48   | 13: 58  |   |   |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ . . .+ |      |      |              |           |         |          |         |   |   |
| DCM1                                                                 | M    | D    | COUNTERS:    | #         |         |          |         |   |   |
|                                                                      |      |      | TRANS        | # 2       | 0       | 1        | 0       |   |   |
|                                                                      |      |      | MSGs - IN    | # 5       | 0       | 3        | 0       |   |   |
|                                                                      |      |      | MSGs - OUT   | # 89      | 0       | 44       | 0       |   |   |
|                                                                      |      |      | BYTES- IN    | # 165     | 0       | 90       | 0       |   |   |
|                                                                      |      |      | BYTES- OUT   | # 21, 210 | 0       | 11, 650  | 0       |   |   |
|                                                                      |      |      | -----        | #-----    | -----   | -----    | -----   |   |   |
|                                                                      |      |      | AVRG TIME:   | #         |         |          |         |   |   |
|                                                                      |      |      | INP- Q. TIME | # . 002s  | . 000s  | . 003s   | . 000s  |   |   |
|                                                                      |      |      | OUT- Q. TIME | # . 000s  | . 000s  | . 000s   | . 000s  |   |   |
|                                                                      |      |      | SRVER- RESP  | # . 055s  | . 000s  | . 080s   | . 000s  |   |   |
|                                                                      |      |      | PRTNR- RESP  | # 6. 685s | . 000s  | 9. 601s  | . 000s  |   |   |
|                                                                      |      |      | OTHER- RESP  | # . 657s  | . 000s  | . 414s   | . 000s  |   |   |
|                                                                      |      |      | TOTAL- RESP  | # 7. 401s | . 000s  | 10. 019s | . 000s  |   |   |
|                                                                      |      |      | -----        | #-----    | -----   | -----    | -----   |   |   |
|                                                                      |      | F    | COUNTERS:    | #         |         |          |         |   |   |
|                                                                      |      |      | TRANS        | # 0       | 0       | 0        | 0       |   |   |
| .                                                                    | .    | .    | .            | .         | .       | .        | .       | . | . |
| .                                                                    | .    | .    | .            | .         | .       | .        | .       | . | . |
| .                                                                    | .    | .    | .            | .         | .       | .        | .       | . | . |
| #===== . . .#                                                        |      |      |              |           |         |          |         |   |   |

**Table 268 Output Format Table**

| Header    | Description                                      | Remarks                                                 |
|-----------|--------------------------------------------------|---------------------------------------------------------|
| Chan ID   | Channel ID.                                      | List the Enabled channels only.                         |
| Appl Name | Application short name.                          | List the applications supported by the channel.         |
| TRAN ID   | Transaction ID.                                  | The main transaction IDs are listed in the table below. |
| Data Type | Statistics data type included in the table line. | See <a href="#">Data Types</a> (on page 736).           |

| Header                           | Description                                                                              | Remarks                                                                                                                                                      |
|----------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total<br>hh:mm- (1)<br>hh:mm (2) | Total accumulating statistics from statistics collection start time (1) until now (2).   |                                                                                                                                                              |
| n<br>hh:mm- (1)<br>hh:mm (2)     | Statistics collected in time interval n, from interval start (1) until interval end (2). | Currently up to 6 time intervals are available for display.<br><br>Note: You can modify the time interval by using parameter INTERVAL in the STATON command. |

**Table 269 Main Transaction ID List**

| Application                                                 | IDs                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control-D/Page On Demand and Control-D File Transfer option | IDs: <ul style="list-style-type: none"> <li>▪ M - Management messages</li> <li>▪ R - User request</li> </ul>                                                                                                                                                                                                                         |
| Control-M                                                   | IDs: <ul style="list-style-type: none"> <li>▪ D- Download</li> <li>▪ F -- Definitions download</li> <li>▪ I - Information request</li> <li>▪ O - Order or force request</li> <li>▪ P - Upload</li> <li>▪ R - User request</li> <li>▪ S - Synchronization</li> <li>▪ T - Definitions upload</li> <li>▪ U - Database update</li> </ul> |
| Control-O                                                   | IDs: <ul style="list-style-type: none"> <li>▪ B - Rules (receive)</li> <li>▪ G - Rules (send)</li> </ul>                                                                                                                                                                                                                             |

## Data Types

**Table 270 Data Types**

| Data Type  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COUNTERS:  | <p>Numeric Counters section.</p> <p>Counters are displayed in the format nn,nnn\$ where \$ is 'K' for Kilo (x 1,024), 'M' for Mega (x 1,024K)</p> <p>TRANS - Number of transactions</p> <p>MSGs -IN - Number of incoming messages</p> <p>MSGs -OUT - Number of outgoing messages</p> <p>BYTES-IN - Number of incoming bytes</p> <p>BYTES-OUT - Number of outgoing bytes</p>                                                                                                   |
| AVRG TIME: | <p>Average transaction response time section.</p> <p>Timers are displayed in the format xx.xxx\$ where \$ is 's' for seconds, 'm' for minute, 'h' for hours and 'd' for days.</p> <p>INP-Q.TIME - Input queue duration</p> <p>OUT-Q.TIME - Output queue duration</p> <p>SRVER-RESP - Application server response time</p> <p>PRTNR-RESP - Partner response time</p> <p>OTHER.TIME - Other transaction states duration</p> <p>TOTAL-RESP - Total transaction response time</p> |

## STATSUM

## Purpose

Print summary statistics data

(Table line levels are: Channel, Application, Counter type).

## Syntax

```
F IOAGATE,STATSUM
```



## Output (DATRACE)

Figure 101 Sample Output DATRACE

| #===== . . .#                                            |      |             |          |         |         |         |        |
|----------------------------------------------------------|------|-------------|----------|---------|---------|---------|--------|
| Chan                                                     | Appl | Data        | # Total  | 1       | 2       | 3       |        |
| ID                                                       | Name | Type        | # 9: 47- | 13: 07- | 13: 17- | 13: 27- |        |
|                                                          |      |             | # 13: 59 | 13: 17  | 13: 27  | 13: 37  |        |
| +-----+-----+-----+-----+-----+-----+-----+-----+ . . .+ |      |             |          |         |         |         |        |
| MCM2                                                     | D    | COUNTERS:   | #        |         |         |         |        |
|                                                          |      | TRANS       | # 140    | 56      | 30      | 17      |        |
|                                                          |      | MSGS - IN   | # 140    | 76      | 30      | 14      |        |
|                                                          |      | MSGS - OUT  | # 140    | 56      | 30      | 17      |        |
|                                                          |      | BYTES-IN    | # 33,080 | 18,568  | 8,256   | 3,488   |        |
|                                                          |      | BYTES-OUT   | # 1,246K | 157K    | 381K    | 291K    |        |
|                                                          |      | -----       | #-----   | -----   | -----   | -----   | . . .+ |
|                                                          |      | AVRG TIME:  | #        |         |         |         |        |
|                                                          |      | INP-Q. TIME | # .004s  | .005s   | .004s   | .011s   |        |
|                                                          |      | OUT-Q. TIME | # .012s  | .001s   | .013s   | .006s   |        |
|                                                          |      | SRVER-RESP  | # 7.032s | 1.313s  | 8.872s  | 4.013s  |        |
|                                                          |      | PRTNR-RESP  | # .000s  | .000s   | .000s   | .000s   |        |
|                                                          |      | OTHER-RESP  | # .002s  | .002s   | .003s   | .003s   |        |
|                                                          |      | TOTAL-RESP  | # 7.052s | 1.322s  | 8.894s  | 4.032s  |        |
|                                                          |      | -----       | #-----   | -----   | -----   | -----   | . . .+ |
|                                                          | 0    | COUNTERS:   | #        |         |         |         |        |
|                                                          |      | TRANS       | # 4      | 12      | 44      | 10      |        |
| .                                                        | .    | .           | .        | .       | .       | .       | .      |
| .                                                        | .    | .           | .        | .       | .       | .       | .      |
| .                                                        | .    | .           | .        | .       | .       | .       | .      |
| #===== . . .#                                            |      |             |          |         |         |         |        |

**Table 271 Output Format Table**

| Header                           | Description                                                                              | Remarks                                                     |
|----------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Chan ID                          | Channel ID.                                                                              | List the 'Enabled' channels only.                           |
| Appl Name                        | Application short name                                                                   | List the applications supported by the channel.             |
| Data Type                        | Statistics data type included in the table line.                                         | See <a href="#">Data Types</a> (on page 736).               |
| Total<br>hh:mm- (1)<br>hh:mm (2) | Total accumulating statistics from statistics collection start time (1) until now (2).   |                                                             |
| n<br>hh:mm- (1)<br>hh:mm (2)     | Statistics collected in time interval n, from interval start (1) until interval end (2). | Currently up to 6 time intervals are available for display. |
|                                  | You can modify the time interval by using the INTERVAL parameter in the STATON command.  |                                                             |

## CLOSE

### Synonyms

CLOSE

### Syntax

To stop handling incoming connections for the specific channel:

```
F IOAGATE,CLOSE=channel_id
```

To stop handling incoming connections for all channels:

```
F IOAGATE,CLOSE=ALL
```

To stop handling incoming connections and shutdown IOAGATE when all clients have been disconnected:

```
F IOAGATE,CLOSE=channel_id/ALL,SHUT
```

## Output Example - CLOSE one channel

---

```
F IOAGATE,CLOSE=D1
```

---

This command produces the following output (JESMSG LG):

---

```
ECAG0AI MODIFY(CLOSE=D1) ACCEPTED
ECAG5CI CHANNEL(MCD1.TCP) CLOSED FOR INCOMING CONNECTIONS, APPLICATION(D)
```

---

## Output Example - CLOSE ALL channels

---

```
F IOAGATE,CLOSE=ALL
```

---

This command produces the following output (JESMSG LG):

---

```
ECAG0AI MODIFY(CLOSE=ALL) ACCEPTED
ECAG5CI CHANNEL(MCD1.TCP) CLOSED FOR INCOMING CONNECTIONS, APPLICATION(D)
ECAG5CI CHANNEL(MCF1.TCP) CLOSED FOR INCOMING CONNECTIONS, APPLICATION(F)
```

---

## Output Example - shutdown IOAGATE

---

```
F IOAGATE,CLOSE=ALL,SHUT
```

---

This command produces the following output (JESMSG LG):

---

```
ECAG0AI MODIFY(CLOSE=ALL,SHUT) ACCEPTED
ECAG5CI CHANNEL(MCD1.TCP) CLOSED FOR INCOMING CONNECTIONS, APPLICATION(D)
ECAG5CI CHANNEL(MCF1.TCP) CLOSED FOR INCOMING CONNECTIONS, APPLICATION(F)
      ECAG5DI IOAGATE WILL BE SHUT DOWN AS SOON AS ALL CLIENTS HAVE DISCONNECTED
      ECAG5HI IOAGATE GOES DOWN DUE TO COMMAND "CLOSE=.,SHUT" ISSUED EARLIER
      -
      CPU (Total) Elapsed      CPU (TCB)
      -Jobname  Stepname ProcStep  RC   I/O hh:mm:ss.th  hh:mm:ss.th  hh:mm:ss.th
      -A61GATED IOAGATE  GATEWAY   00   7398   02:23.78  23:32:03.38   01:54.00
      IEF404I A61GATED - ENDED - TIME=13.31.13
```

---

## OPEN

### Synonyms

OPEN

## Purpose

Resume handling incoming connections.

## Syntax

To resume handling incoming connections by the specific channel that was previously closed:

```
F IOAGATE,OPEN=channel_id
```

To resume handling incoming connections all channels that were previously closed:

```
F IOAGATE,CLOSE=ALL
```

## Output Example - OPEN one channel

```
F IOAGATE,OPEN=D1
```

This command produces the following output (JESMSG LG):

a) Channel D1 was previously closed:

```
ECAG0AI MODIFY(OPEN=D1) ACCEPTED
```

```
ECAG5CI CHANNEL(MCD1.TCP) OPENED FOR INCOMING CONNECTIONS, APPLICATION(D)
```

b) Channel D1 was not previously closed:

```
ECAG0AI MODIFY(OPEN=D1) ACCEPTED
```

```
ECAG0KW MODIFY(OPEN) REJECTED, SPECIFIED CHANNEL WAS NOT CLOSED
```

## Output Example - OPEN ALL channels

```
F IOAGATE,OPEN=ALL
```

This command produces the following output (JESMSG LG):

a) All channels were previously closed:

```
ECAG0AI MODIFY(OPEN=ALL) ACCEPTED
```

```
ECAG5CI CHANNEL(MCD1.TCP) OPENED FOR INCOMING CONNECTIONS, APPLICATION(D)
```

```
ECAG5CI CHANNEL(MCF1.TCP) OPENED FOR INCOMING CONNECTIONS, APPLICATION(F)
```

b) Some channel was not previously closed:

```
ECAG0AI MODIFY(OPEN=ALL) ACCEPTED
```

```
ECAG5CI CHANNEL(MCF1.TCP) OPENED FOR INCOMING CONNECTIONS, APPLICATION(F)
```

## LOGINMSG

### Purpose

Controls the destinations where ECAG62I messages will be sent. These messages indicate that a user successfully logged on to IOAGATE over a multiple connection (MC) TCP channel.

### Synonyms

LOGINMSG

### Syntax

To show the current values of the LOGINMSG parameter in all MC channels, enter the following modify command:

```
F IOAGATE,LOGINMSG=SHOW
```

This command produces the following output (JESMSGGLG):

```
ECAG0LI CHANNEL channel-id CURRENT LOGINMSG VALUE:value
```

To dynamically override the value of the LOGINMSG parameter in all MC channels to one of the values listed below, enter the following modify command:

```
F IOAGATE,LOGINMSG=value
```

In the preceding syntax statement, *value* can have the following meanings:

YES – The ECAG62I message is issued to LOG (DAIGLOG) and WTO

NO – The ECAG62I message is issued to LOG (DAIGLOG) only

OFF – The ECAG62I message is not issued

WTO – The ECAG62I message is issued to WTO only

LOG – The ECAG62I message is issued to LOG (DAIGLOG) only

LOG+WTO – The ECAG62I message is issued to both LOG (DAIGLOG) and WTO

WTO+LOG – The ECAG62I message is issued to both LOG (DAIGLOG) and WTO

To dynamically override the value of the LONGINMSG parameter in a specific MC channel, enter the following modify command:

```
F IOAGATE,LOGINMSG=value,CHAN=channel-id
```

```
F ioagate,LONGINMSG=value,CHAN=channel-id
```

In the preceding syntax statement, *value* can have the meanings shown above, and *channel-id* is the specific MC channel whose value you want to change.

## Diagnostic SNAP Modify Commands

The following commands are for diagnostic usage. Use only when asked by a BMC representative.

Area SNAPs are written to the DATRACE DD statement.

### PRINTSST

#### Synonyms

PSST

#### Purpose

Print Servers Status Table area.

This table represents all the applications address space tasks communicating with IOAGATE.

#### Syntax

To print all SST entries

```
F IOAGATE,PRINTSST
```

To print SST entry of a specific task

---

```
F IOAGATE,PRINTSST=<Task ID>
```

---

### PRINTSDT

#### Synonyms

PSDT

#### Purpose

Print Server Descriptor Table area.

This table represent all the servers tasks initialization definitions (built based on member ECAPARM)

#### Syntax

To print all SDT entries

```
F IOAGATE,PRINTSDT
```

To print SDT entry of a specific server task

## PRINTSTD

### Synonyms

PSTD

### Purpose

Print Subtask Descriptor Table area. This table represent all the IOAGATE tasks.

### Syntax

To print all STD entries

```
F IOAGATE,PRINTSTD
```

To print STD entry number *nn*

```
F IOAGATE,PRINTSTD=<nn>
```

## PRINTCMT

### Synonyms

PCMT

### Purpose

Print Communication Table area. This table represents the TCP/IP communication tasks.

### Syntax

To print all CMT entries

---

```
F IOAGATE,PRINTCMT
```

---

To print CMT entry number *nn*

---

```
F IOAGATE,PRINTCMT=<nn>
```

---

## PRINTALL

### Synonyms

PALL

### Purpose

Print all tables areas.

### Syntax

F IOAGATE,PRINTALL

## PRINTWCT

### Synonyms

PWCT

### Purpose

*Print gateWay master Control Table.* This table includes internal IOAGATE data.

### Syntax

F IOAGATE,PRINTWCT

## PRINTSIB

### Synonyms

PSIB

### Purpose

Print Service Instance control Blocks area. These blocks represent the messages held in IOAGATE.

### Syntax

To print all SIB entries:

F IOAGATE,PRINTSIB



## Exits

### Overview

Various user exits are provided to enable you to modify the operation of INCONTROL products to suit your site's needs. These exits are contained in members of the IOA SAMPEXIT library. The names of these members are usually in the format `IOAXnnn`, `IOXXnnn` or `CTxXnnn`, where *x* indicates the INCONTROL product and *nnn* is the exit number.

Some special exits (also known as localized versions of exits) are also provided. Special exits are identified by an additional character at the end of the member name (for example, `IOAX006D`). All special exits are associated with a default exit (an exit whose member name matches the first seven characters of the special exit name).

A full explanation of how to use each exit is contained at the beginning of the corresponding default exit member.

The documentation in this chapter assumes that the reader has a general knowledge of SMP/E.

### Creating USERMODs using the ICE Automatic Exit Installation Tool

Exits are installed and customized using the ICE Automatic Exit Installation tool. This tool does the following:

- facilitates the editing of the exit source code
- builds an installation job that creates an SMP/E USERMOD for installing the exit
- enables the editing of the installation job that creates the SMP/E USERMOD
- places the USERMOD members in the CUSTEXIT library
- can also be modified to implement roof exits (for more information, see [Creating USERMODs for Roof Exits](#) (on page 747))

Names of the USERMOD members are in the format `UMxXnnn[a]`, where *x* indicates the INCONTROL product, *nnn* is the exit number, and *a* is an [optional] additional character. For example, the USERMOD created for exit `CTDX015V` is in member `UMDX015V`.

In prior versions, exits were installed by modifying a USERMOD for each exit directly. While this is still possible, you must first enter the ICE Automatic Exit Installation tool to build the first copy of the USERMOD and place it in the CUSTEXIT dataset. Once you have created the first copy of the USERMOD, you can then modify the exit's USERMOD directly.

BMC recommends that you make all modifications using the ICE Automatic Exit Installation tool. However, if you choose to modify the USERMODs directly, back up any local modifications to the USERMOD before modifying a USERMOD, and then edit that USERMOD to fit your requirements.

BMC does not undertake to provide USERMODs for all special or customized exits.

## Running the ICE Automatic Exit Installation Tool

The ICE Automatic Exit Installation tool enables the creation and customization of exits and is run using the INCONTROL Installation and Customization Engine (ICE).

In some cases (for example, for the external macro libraries of other products) you may need to concatenate an external MACLIB library to the SYSLIB library (for example, LMS, STK). If your local compilation requires an external MACLIB, first create the USERMOD using the automated exit installation tool, and then modify the USERMOD at the location marked  
' --- U P D A T E '

Perform the following steps to run the ICE Automatic Exit Installation tool:

### Installation Steps

Installation steps are based on ICE. For instructions on how to start and use ICE, see the *INCONTROL for z/OS Installation Guide: Installing*.

1. In the ICE main screen, select Customization.
2. Verify that **IOA** is specified in the **Product** field, and that **YES** is specified in the **Enforce Step Order** field.
3. Select **Product Customization**.
4. Select major step 4, "User EXITs Installation."
5. Select minor step 2, "EXITs Customization."
6. In the USERMOD Creation screen, enter the name of the exit (or roof exit) to install or customize. This process creates the installation job for the exit.

Default exit names are seven characters in length (for example, CTBX001, IOAX006). To install or customize a localized (special) version of one of these exits, enter its full eight-character name (for example, CTDX022D, CTOX001V).

7. If necessary, verify exit installation job source copy. Use the **END** command (**PF3/PF15**) to receive the application job source copy.

If ICE locates an existing copy of the exit installation job in the CUSTEXIT library, the Exit Source Copy screen is displayed. You can use the existing copy of the exit installation job found in the CUSTEXIT library by replying **Y** (Yes) to the prompt on this screen. Alternatively, you can replace the job with the original from the SAMPEXIT library by replying **N** (No). The default is Y (that is, use the existing job in the CUSTEXIT library).

8. If necessary, verify application job source copy.

If ICE locates an existing copy of the application job in the CUSTEXIT library, the USERMOD Application Job screen is displayed. You can use the existing copy of the application job in the CUSTEXIT library by replying Y (Yes) to the prompt on the screen. Alternatively, you can replace the job with the original from the CUSTEXIT library by replying N (No). The default is Y, (that is, use the existing job in the CUSTEXIT library).

## USERMOD Installation Jobs

USERMOD installation jobs often need to be submitted more than once. Therefore, each job contains an SMP/E REJECT command to delete the previous copy of the USERMOD from the SMPPTS dataset and the SMP/E global zone.

The first time each USERMOD job is submitted, it terminates with a return code of 12. This return code is expected because there is nothing to reject.

To avoid interrupting the SMP/E command stream after receiving a return code of 12, the installation job contains an SMP/E RESETRC command after the REJECT.

Never ACCEPT a USERMOD.

## Creating USERMODs for Roof Exits

A roof exit (or driver exit) is used to activate as many as nine other sample exits. Each sample exit activates a different function. The driver exit calls each sample exit in turn. The ICE Automatic Exit Installation tool fully supports the creation of USERMODs for roof exits.

Installing a version of an exit is different from installing the same version under its corresponding roof exit. The load module name that is created for the same exit version is different. If the exit version is installed as a stand-alone exit version, the load module name is the default (for example, CTMX001). If the exit version is installed under the roof exit, the load module name is the full eight-character version name (for example, CTMX001A).

### ➤ To install the roof version of an exit:

1. When using the roof version of an exit, you must first install all the versions of the exit that you need, one by one, by following the instructions in the USERMOD installation job. (Follow steps 1a through 1c for each exit in the roof exit.)
  - a. Start the ICE Automatic Exit Installation tool.
  - b. Specify the exit you want to install.
  - c. Make the changes in the USERMOD installation job that was built by the automatic exit installation tool as specified in the following lines. (*Do not modify lines that are not listed below!*)

**Table 272 Changes to the USERMOD Installation Job**

*from:* INCLUDE AIOALOAD(<defaultexit>)    *to:* INCLUDE AIOALOAD(<roofexit>)

*from:* NAME <defaultexit>(R)                      *to:* NAME <roofexit>(R)

*from:* ++SRC(<defaultexit>) DISTLIB(ASAMPEXT) DISTMOD(AIOALOAD) .  
*to:*    ++SRC(<roofexit>) DISTLIB(ASAMPEXT) DISTMOD(AIOALOAD) .

where <defaultexit> is the name of the default exit and <roofexit> is the full, eight-character name of this exit when run under the roof.

2. Install the roof version of the exit with the ICE Automatic Exit Installation tool. To do this, specify the versions of the exit that you want to implement in the source of the roof exit, as follows:

```
&MODULE1 SETC 'CTMX001A' FIRST EXIT TO BE CALLED
&MODULE2 SETC 'CTMX001B' 2'ND EXIT TO BE CALLED
&MODULE3 SETC ' ' 3'RD EXIT TO BE CALLED
&MODULE4 SETC ' ' 4'TH EXIT TO BE CALLED
&MODULE5 SETC ' ' 5'TH EXIT TO BE CALLED
&MODULE6 SETC ' ' 6'TH EXIT TO BE CALLED
```

INCONTROL products that currently contain roof exits include IOA, Control-M, and Control-M/Restart.

## Linkedit Updates

Link-editing is performed by SMP/E. Therefore, to change the link-edit statements in a load-module, SMP/E must be informed using JCLIN. JCLIN is also applied using an SMP/E USERMOD.

If JCLIN is installed without any element (SRC – source or MOD – module), SMP/E is updated with link-edit statement changes, but no link-edit is performed. The new link-edit statements are used only when SMP/E is requested to change the load-module because an element is being updated or replaced. To ensure that the new link-edit statements are used, an element is provided with the USERMOD containing JCLIN.

## Including Local CSECTs in IOA Exits

If a local CSECT is included in an IOA exit, perform the following steps:

1. Add 'INCLUDE AIOALOAD(LOCAL-CSECT-NAME)' after the last include statement.
2. Add ++SRC(CSECT-NAME) or ++MOD(CSECT-NAME) after the DD statement of the last source ( ++SRC) or last module ( ++MOD) in the USERMOD updated, as follows:

|                                                                       |                          |
|-----------------------------------------------------------------------|--------------------------|
| <b>++SRC( EXI TXXX) SYSLI B( CUSTEXI T) DI STL I B( ASAMPEXT)</b>     | <b>ORI GI NAL- LI NE</b> |
| <b>DI STMOD( AI OALOAD) .</b>                                         | <b>ORI GI NAL- LI NE</b> |
| <b>/*</b>                                                             | <b>ORI GI NAL- LI NE</b> |
| <b>// DD DI SP=SHR,</b>                                               | <b>ORI GI NAL- LI NE</b> |
| <b>// DSN=%I LPREFA%. CUSTEXI T( EXI TXXX)</b>                        | <b>ORI GI NAL- LI NE</b> |
| <b>// DD *</b>                                                        | <b>ADDED- LI NE</b>      |
| <b>++SRC( LOCAL- CSECT) SYSLI B( CUSTEXI T) DI STL I B( ASAMPEXT)</b> | <b>ADDED- LI NE</b>      |
| <b>DI STMOD( AI OALOAD) .</b>                                         | <b>ADDED- LI NE</b>      |
| <b>/*</b>                                                             | <b>ADDED- LI NE</b>      |
| <b>// DD DI SP=SHR,</b>                                               | <b>ADDED- LI NE</b>      |
| <b>// DSN=LI BRARY- CONTAINI NG- THE- ELEMEN T( LOCAL- CSECT)</b>     | <b>ADDED- LI NE</b>      |

## Summary – USERMOD Jobs

Before submitting the USERMOD jobs, perform the following steps:

1. Verify that a backup of the LOAD library exists.
2. Make all necessary updates to the USERMOD, as follows:
  - a. Update the JCLIN (link-edit input statements) if required.
  - b. Update the source exit name in the SMP/E ++SRC statement, if necessary.
  - c. Update the library and member names of the source exit in the IOA SAMPEXIT library on the unnamed DD statement following the ++SRC statement.
3. Submit the job. It performs SMP/E RECEIVE and APPLY commands, selecting the SMP/E USERMOD just created. Never run ACCEPT on USERMODs.

When applying a PTF that installs an exit that was already locally installed, the APPLY fails with the message

```
GIM38201E - THERE IS A MODID ERROR FOR SAMP ENTRY sample-name IN SYSMOD ptf-name .
```

To bypass this error add the BYPASS(ID) operand to the APPLY. It is important that you make sure that this is the only failure in that APPLY before using that BYPASS operand.

## IOA Exits

The following table describes the available IOA exits:

**Table 273 IOA Exits**

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IOAX006 | <p>This exit controls the use of the IOA Online facility.</p> <p>IOAX006 and IOAX009 are twin exits. IOAX006 is invoked by the Online facility before the entry panel is displayed. When signing on to the Online facility through the online monitor, Exit IOAX009 is invoked first, followed by Exit IOAX006). When the Online facility is used without the online monitor, only Exit IOAX006 is invoked). These exits can be used to display a sign-on window for users to enter their user ID and password or password phrase.</p> <p>These sign-on modules determine and build the user's identity for all subsequent actions. They both have similar structure, parameters, return codes and functionality. However, they work in different address spaces. The home address space is the primary address space requesting and receiving services from the online monitor address space using the cross-memory facilities. Exit IOAX006 is invoked in the online monitor address space (when signing on through the online monitor). Exit IOAX009 is invoked in the home address space for the VTAM monitor, CICS, IMS, CA-ROSCOE, and so on. The control block that represents the user's identity accompanies the user during the entire session with the IOA Online services facility.</p> <p>In the online monitor environment, the ACEE control block is stored in the user's TCB (Task Control Block) and the OCT (Online Control Table). MVS recognizes the ACEE as a standard control block to be used for authorization checks, so that task level security feature is achieved. If the ACEE is not stored in the TCB, either because module IOASE06 is not implemented or because the security package does not build an ACEE (for example, ACF2 in native mode), then all authorization checks for file access are performed using the identity of the online monitor address space. All authorization checks are performed using the correct user's ACEE. If the ACEE is not built, it is quite likely that the security interface does not perform the authorization checks correctly.</p> <p>MVS checks authorization for actions such as opening files by first checking if there is an ACEE in the current TCB. If it is found, authorization checks are performed using the TCB's ACEE. If it is not found, MVS continues to search for the appropriate TCB until the ACEE associated with the address space is found.</p> |

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | <p>In an environment where security is not implemented, Exits IOAX006 and IOAX009 can set the OCTUSER parameter, which is the reference parameter for all programs used as the identity of the current working user ID.</p> <p><b>Note:</b> When using the Online facility under CA-ROSCOE, the IOA security interface receives the CA-ROSCOE started task procedure and not the user's own user ID. Therefore the user must sign on both under ROSCOE and under IOA. To avoid forcing the user to sign on twice, special routine IOARROT is provided in the IOA SAMPLE library. This routine retrieves the user ID from the corresponding CA-ROSCOE control block and places it in IOA so that it can be used for additional security authorizations. Before calling the standard IOA security modules, routine IOARROT must be called from within the IOA Online environment. This call must be placed in an IOA user module that is invoked before module IOASE06 and IOASE09 are called. The user modules that support CA-ROSCOE for IOA Online facility communication are IOAX006T and IOAX009. These modules reside in the IOA SAMPEXIT library.</p> <p>User Exit IOAX006T must be called when all IOA functions are performed under native CA-ROSCOE address space.</p> <p><b>Note:</b> When two environments run simultaneously, both user modules are placed in the IOA LOAD library. User Exit IOAX006T is invoked in the online monitor address space as well, but cannot locate the required control blocks because there are no CA-ROSCOE control blocks in the online monitor address space. The started session abends. BMC recommends that these two modules be placed in the special IOA LOAD library that is concatenated to the STEPLIB in the CA-ROSCOE started task procedure before the IOA LOAD library.</p> |
| IOAX007 | <p>This exit can be used to control update of the IOA Conditions file and the Control-M Resources file. For further details, see the <i>INCONTROL for z/OS Security Guide</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IOAX009 | <p>This exit controls entry to the IOA Online facility when working with the Online monitor (under CICS, VTAM, IMS/DC, TSO/ROSCOE cross memory options, COM-LETE and IDMS/DC).</p> <p>User Exit IOAX009T must be called when CA-ROSCOE communicates with IOA through cross-memory services. All IOA functions are performed in the separate address space, which is the IOA Online monitor address space (OMON1).</p> <p>In an environment where security is not implemented, Exits IOAX006 and IOAX009 can set a value for parameter OCTUSER, which is used by all programs as the identity of the current user ID.</p> <p>For details, see the exit source for Exit IOAX009 and Exit IOAX006, and the description of Exit IOAX006 above.</p> |
| IOAX012 | This exit can be used to control or modify operator commands issued by utilities CTMOPR, CTDOPR and IOAOPR, by Control-O and by the Control-M and Control-D and Control-V New Day procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| IOAX016 | Mainframe application server exit. This exit is called when a logon request is made by Control-D/Page On Demand. The mainframe logon user ID and password from the Control-D/WebAccess Server Communication Setup menu are passed to the exit. This exit is provided as a dummy load module. The associated security module is IOASE016.                                                                                                                                                                                                                                                                                                                                                                                                       |
| IOAX028 | IOA definition screen exit. This exit is invoked each time the user presses the <b>Enter</b> or <b>PF03/PF15</b> key to exit an IOA definition screen. This exit is relevant for all IOA definition screens (Screens 2, 3.Z, 8, R, M, TR, TV, TP, BM, BR, OR, and C).                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| IOAX029 | IOA Online Sysout or Report Viewing exit. This exit is activated as part of the Online viewing facility invoked for each sysout or report line that is to be displayed on the user terminal. For example, this exit allows translation of unprintable characters. This exit also provides additional features (for example, making special data invisible on the report).                                                                                                                                                                                                                                                                                                                                                                      |
| IOAX031 | IOA Log exit. This exit is invoked before a message is written to the IOA Log file. The exit can be used to write the message on other files (SMF, and so on) or to accumulate message statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IOAX032 | <p>This exit is invoked in all IOA panels each time an IOA user attempts to perform an operation on a PDS library or member in a PDS library. This exit can deny operations such as accessing a library, listing its directory and browsing, editing or saving a member. The exit is invoked when a user requests to edit JCL members or documentation data through Control-M/Enterprise Manager. The exit checks authorization and either grants or denies the Edit (or Save) request prior to the performance of these operations by the Control-M Application Server (CTMAS).</p> <p>This exit can also be used to enable 'Forced Browse' of an IOA PDS member by denying the user Edit authority, but granting the user View (Browse) authority for the requested library or member.</p> |
| IOAX034 | <p>Receives control for every message issued by the IOA Shout facility. This exit can modify the message text, change its destination, or suppress it. This exit can be activated by the Control-O monitor, the Control-M monitor or an IOA Functional monitor (used with Control-M/Tape).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| IOAX035 | <p>IOA Account Information Extraction exit. This exit is invoked by an INCONTROL product whenever account field information is required. Exit IOAX035 can extract the requested information from different parts of the account field depending on site customization. The exit can be invoked by CDAM when writing directly to a CDAM file, by Control-D when decollating from a spooler, by Control-M/Tape when a job's account field is copied to the Media Database, and so on</p>                                                                                                                                                                                                                                                                                                       |
| IOAX036 | <p>IOA Access Method (IOAAM) exit. This exit is invoked whenever program IOADBF is executed, both as an independent utility program and when called internally by IOA Access Method I/O routines. This exit can check for which function it is being called and either grant or deny the request.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| IOAX037 | <p>IOA translation exit. This exit contains four 256-byte translation tables for the IOA online routines. This exit can be used to translate IOA screens to any language supported at the site. In addition, it can implement upper casing, special characters sets and other capabilities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| IOAX038 | <p>IOA Functional monitor exit. This exit is invoked before writing a request to the Functional monitor queue. The return code of the exit determines whether the request is or is not written. For performance reasons, Exit IOAX038 in the IOA LOAD library is a dummy exit.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| Exit    | Description                                                                                                                                                                                                                                                                                                   |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IOAX039 | IOA Page Separating exit. This exit is invoked during the creation of a CDAM file by a Control-D decollating mission or during direct writing to a CDAM file by a job. The exit can control page separation in a CDAM file being created.                                                                     |
| IOAX040 | IOA Utilities Invocation exit. This security exit is invoked by certain IOA utilities to <ul style="list-style-type: none"> <li>determine whether the user is authorized to use the utility program</li> <li>determine whether the user is authorized to perform specific functions of the utility</li> </ul> |

## Control-M Exits

The following table describes the available Control-M exits:

**Table 274 Control-M Exits**

| Exit     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTMX001  | This exit is invoked for every job order that must be placed in the Active Jobs file. The exit is usually used to modify job production parameters. This exit has an associated security module CTMSE01. For further details, see the <i>INCONTROL for z/OS Security Guide</i> .                                                                                                                                                                                                                                                            |
| CTMX001R | This exit is called a roof exit or driver exit because it can be used to activate as many as nine other Control-M sample exits. Each sample exit activates a different function. The driver exit calls each sample exit in turn.<br><br>This roof exit is invoked during the Job Ordering process and receives the scheduling definition records. This roof exit enables the customer to combine several samples of Control-M exits prefixed by CTMX001, each exit performing a specific processing function on job scheduling definitions. |
| CTMX002  | Control-M submission exit. Every line of the job stream submitted by Control-M can be modified or deleted or replaced, and so on This exit has an associated security module CTMSE02. For further details, see the <i>INCONTROL for z/OS Security Guide</i> .                                                                                                                                                                                                                                                                               |

| Exit     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTMX002@ | <p>This exit is called a roof exit or driver exit because it can be used to activate as many as nine other Control-M sample exits. Each sample exit activates a different function. The driver exit calls each sample exit in turn.</p> <p>This roof exit is invoked during the job submission process and receives JCL cards for a submitted job. This roof exit enables the customer to combine several samples of Control-M exits prefixed by CTMX002, each exit performing a specific processing function on job JCL records.</p>                                                                                                                           |
| CTMX003  | <p>Control-M SYSOUT scan exit. After the job finishes executing, every line of the job's SYSDATA is passed to the exit. The main use of this exit is to detect user generated constants in the SYSOUT (such as program DISPLAY messages) and to affect the execution results of the current job accordingly.</p> <p>SYSDATA is an IOA term used to designate the data in the following three job SYSOUT datasets: job log (console messages), expanded JCL, and system output messages.</p>                                                                                                                                                                     |
| CTMX004  | <p>This exit allows the user to change the defaults of the Control-M scheduling algorithm by assigning weights to quantitative resources. In this way, Control-M can be fine-tuned to achieve maximum throughput.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| CTMX005  | <p>Exit CTMX005 is an integral part of the statistical data accumulation process. It is invoked by utility CTMJSA, which accumulates job statistical data from the IOA Log file. The exit can be used for the following purposes:</p> <p>By default the machine ID (one-character) is automatically derived from the SYSID (four-character) and from information contained in CTMPARM, before Exit CTMX005 is invoked. Exit CTMX005 can override the machine ID.</p> <p>Exit CTMX005 enables the user to incorporate additional statistical data from sources other than the IOA Log (for example, performance monitors) into the job execution statistics.</p> |

| Exit     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTMX008  | <p>This exit is used to control access to the Active Jobs file, such as user authorization line commands (hold, delete, and so on). This exit has an associated security module CTMSE08. For further details, see the <i>INCONTROL for z/OS Security Guide</i>.</p> <p>Exit CTMX008 and security module CTMSE08 are also invoked by the Control-M Application Server (CTMAS) and the Control-M Application Server Interface (CTMAPI).</p> <p>CTMX008 may be invoked from the Active Environment screen (Screen 3) by using option X. For further details, see the <i>Control-M for z/OS User Guide</i>.</p> |
| CTMX010  | This exit is used to control job submission using the Quick Submit facility. For example, it can force the use of Control-M for production job submissions under TSO.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| CTMX013  | This exit is invoked each time a line is displayed by the Control-M Online facility in the Job Statistics screen (Screen 3.S). The exit can modify the line to be displayed.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CTMX014  | This exit is invoked when a request is made to edit a JCL member under Screen 2 and Screen 3 of the Online facility.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| CTMX015  | This exit is invoked when a job has finished executing and has been assigned a Control-M termination status.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CTMX015R | <p>This exit is called a roof exit or driver exit because it can be used to activate as many as nine other Control-M sample exits. Each sample exit activates a different function. The driver exit calls each sample exit in turn.</p> <p>This roof exit is invoked during job post-processing (that is, when a job finished its run and Control-M assigns status ENDED OK or ENDED NOTOK to a job). This roof exit enables the customer to combine several samples of Control-M exits that are prefixed by CTMX015, each exit performing a specific function on the post processing of a job.</p>         |
| CTMX017  | The exit receives control each time the Tape Pull list utility (CTMTAPUL) attempts to resolve volumes for each DD statement of the job.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| CTMX018  | This exit receives control during the process of determining the anticipated elapse time of a job.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| CTMX019  | This exit receives control during the Control-M external writer initialization phase.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTMX020 | This exit is called when a specific job starts and when it is still found running after its DUE-OUT time. The exit may be used to change the service class setting that the Control-M monitor, based on its search and matching algorithm, is about to reset the job to. For further details, see <a href="#">Workload management service class support</a> (on page 297). |

Some Control-M exits can be dynamically reloaded by issuing a Control-M operator command—with no need to recycle the Control-M Monitor. For more information, see [Dynamically Reloading User Exits](#) (on page 205).

## CMEM Exits

The Control-M Event Manager (CMEM) can also use the following Control-O exits:

**Table 275 Control-O Exits Used by CMEM**

| Exit    | Description                                                                                                                                           |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTOX001 | Receives control under the Online interface whenever rule ORDER/FORCE is performed.                                                                   |
| CTOX002 | Receives control for every rule before it is loaded to the active environment. This exit can be used to modify rule parameters prior to rule loading. |

## Control-M Application Server Exits

The Control-M Application Server can use the following exit:

**Table 276 Control-M Application Server Exits**

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                           |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTWX001 | This exit is called when the Control-M Application Server receives a message from the Control-M/Enterprise Manager datacenter. The exit can be used to change the user name contained in the incoming message header. For example, this exit can translate a user ID for Control-M/Enterprise Manager, which can be 1 to 64 characters, to a valid mainframe user ID. |

## Control-M/Restart Exits

The following table describes the available Control-M/Restart exits:

**Table 277      Control-M/Restart Exits**

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTRX001 | <p>This exit is activated by Control-M/Restart. It allows better control of Control-M/Restart execution and can be used to interface with other products (for example, for checking non-standard datasets).</p> <p>BMC provides several samples of CTRX001 exits in the IOA SAMPEXIT library to interface with various tape management products to extend the processing capabilities of Control-M/Restart. For example, when used as an interface with Control-M/Tape, sample exit CTRX001T receives dataset DELETE requests and changes the Control-M/Tape controlled dataset status to Immediate-Scratch (the default) or Deferred-Scratch (if specified). Datasets with a status of Deferred-Scratch are expired by the next run of the CTTRTM Control-M/Tape Retention Management utility. By default, this exit causes Control-M/Tape controlled datasets to be scratched immediately (that is, without running the CTTRTM utility).</p> <p>For more information see the chapter about operation considerations in the <i>Control-M/Restart User Guide</i>.</p> |

| Exit     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTRX001G | <p>This exit is called a roof exit or driver exit because it can be used to activate as many as nine other Control-M/Restart sample exits. Each sample exit activates a different function. The driver exit calls each sample exit in turn.</p> <p>For example, Exit CTRX001G can be used to activate two tape management products: CA-1 and Control-M/Tape. The instructions below can be expanded to create a driver exit for more than two functions.</p> <p>When Control-M/Restart restarts a job containing Control-M/Analyzer steps, Exit CTRX001Q calls the Control-M/Analyzer Rollback facility to roll back those database variables that had been created by Control-M/Analyzer steps that are to be restarted. The rolled back values are physically deleted from the Control-M/Analyzer database and the space they occupied becomes available for new variable generations.</p> <p>For information about how to invoke the Control-M/Analyzer Rollback Facility using procedure CONTROLR, see <a href="#">Control-M/Analyzer</a> (on page 614).</p> <p>The return codes are</p> <ul style="list-style-type: none"> <li>0—normal termination</li> <li>4—security violation</li> <li>8—error opening database</li> <li>12—internal error reading database record</li> <li>16—error during CTBDBV call</li> </ul> |
| CTRX014  | <p>This exit is invoked by Control-M/Restart using the IOA online Active Environment screen, Screen 3.V, before a SYSOUT is viewed. This exit can be used for the following purposes:</p> <ul style="list-style-type: none"> <li>to verify or change parameters and control blocks</li> <li>for CDAM manipulation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## Control-D and Control-V Exits

The following table describes the available Control-D and Control-V exits:

**Table 278 Control-D and Control-V Exits**

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTDX001 | Receives control for every mission that must be placed on the Active Missions file. This exit is usually used to modify mission production parameters. For details, review the <i>INCONTROL for z/OS Security Guide</i> .                                                                                                                                                                                                                                                                                           |
| CTDX002 | Printer command exit. This exit receives control at the end of any chunk of lines that is sent by Control-D to the spool. This exit can issue operator commands to set the printer for the coming chunk. (Contact BMC Customer Support before using this exit.)                                                                                                                                                                                                                                                     |
| CTDX003 | <p>Control-D banner exit. This exit receives control at the beginning and end of every print mission or the beginning of a user in the bundle or for every report in the bundle or for every chunk in the bundle.</p> <p>This exit produces banner pages at any level and in any desired format. It can also, optionally, produce an index of the reports in a bundle. For a detailed explanation of how to tailor and use the banner exit, see <a href="#">Tailoring Control-D Banner Exits</a> (on page 767).</p> |



| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTDX004 | <p>This exit authorizes access to User Reports List files. When a user displays a list of reports, which can be refined by specifying report selection criteria, the list is based on the authorization assigned to that user. The user can then perform operations on these reports. However, the user can only view the decollated portions.</p> <p>When Control-D is installed, a default dummy exit is active. To facilitate installation and product testing, this exit does not enforce any security standards. When security standards are not enforced, all of the users can view all reports using option U. When Control-D becomes operational and access to its Online facility is given to many users, BMC recommends that you use either security module CTDSE04 or sample User Exit CTDX004A.</p> <p>Sample Exit CTDX004A retrieves security definitions from the Recipient Tree. The administrator can identify one or more recipients in the Recipient Tree with a TSO logon (or logon, CICS, VTAM, and so on) user ID. These authorizations enable users to see reports under Option U. The user IDs to be authorized must be specified in the AUTHORIZE field in the definition of each recipient that is authorized to view that ID's reports. For more information, see the Recipient Definition screen in the online facilities chapter of the <i>Control-D and Control-V User Guide</i>. When a user is authorized in the Recipient Tree, it means that the TSO (or CICS, IMS, DC, and so on) user can view all the reports of that recipient and the reports of that recipient's descendants in the Recipient Tree. The same TSO user ID (or other environment's sign-on ID) can be defined for more than one recipient in the Recipient Tree.</p> <p>Note: Decollated report pages can be sent to recipients that are not listed in the Recipient Tree. For information about how to do this, see the implementation hints chapter in the <i>Control-D and Control-V User Guide</i>.</p> <p>User ID identification in the AUTHORIZE field is performed according to the following rules:</p> <p>The specified user ID can contain a number of ? characters. This wildcard character indicates any single character.</p> |

| Exit | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | <p><b>Example of Exit CTDX004</b></p> <p>AUTHORIZE A??X matches AIOX01, but does not match A1X01. Programmers with TSO user IDs beginning with T10 are responsible for reports assigned to the AP department. JOHN is the only programmer who writes programs also for the DOD contracts section that is classified. JOHN and every programmer whose user ID starts with T10 can view reports of all the members in the programming departments and all reports of the AP department. There is one exception: except for JOHN (T1002), no one can look at the DOD contracts section and at JOHN's reports. JOHN's boss (TSO user T1001) can look at JOHN's test reports. But not at the DOD production reports. Every user in the AP department can look at their own reports only.</p> <p>The Active User Reports List file also contains entries that describe the entire original report. The entries are referenced by a specially reserved user name – \$SYSDATA. Authorized users can perform Online viewing of the original report, which is now compressed. The authorization for accessing \$SYSDATA entries is also controlled by this exit. A user who is authorized in the Recipient Definition screen can also be allowed to view \$SYSDATA entries if the SYSDATA field contains the value Y (Yes). For more information, see the Recipient Definition screen in the online facilities chapter of the Control-D and Control-V User Guide.</p> <p>BMC recommends that a restricted number of operations personnel, be authorize the use the SYSDATA option because this option allows viewing of original reports.</p> <p>This exit also receives control for every function performed on an entry in the User Report List file (for example, update, print, restore, view, index functions). It is possible to control who is allowed to request a restore, to determine the maximum number of pages to be printed to a remote printer, and so on This can also be performed by the security interface module (CTDSE04). If CTDSE04 is installed, the use of Sample Exit CTDX004A is not necessary.</p> <p><b>Default Global Ruler</b></p> <p>Each report can have a default ruler whose name is DEFAULT. User Exit CTDX004 can change the ruler that is used as this default to a global ruler whose name begins with \$. Before Control-D looks for the report's default ruler, it calls Exit CTDX004 and CTDSE04 with function DEFGRUL. The user exit can return the global ruler name that must be used as the default ruler, and the security exit can check whether the user is allowed to change the default global ruler name.</p> |

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTDX005 | <p>This exit receives every line to be printed by the Control-D Printers Control monitor before actual printing takes place. The exit can prevent the line from being printed, change its contents or add more lines to the printed output. Examples of its use are Print page sequence numbers from the beginning of the printing mission (these numbers can be printed in the bundle index as well).</p> <p>The actual printing is suppressed and the bundle is saved to a sequential file (for file transfer to RJE stations, and so on). For more information, see <a href="#">Control-D and Control-V</a> (on page 366).</p>                                                                                                                                                                                                                                          |
| CTDX006 | <p>SMF exit. This exit receives control before each Control-D SMF record is written to the SMF datasets. It can suppress the record or change it. The SMF record written by Control-D is created for each combination of User or Report or Job name. Therefore, it allows accounting on each level – including accounting by report recipient. The number of pages is accurate (unlike SMF type 6 records that use approximate numbers).</p> <p>Note: SMF type 6 records are created by JES for the Control-D Printers Control monitor when it prints bundles. Therefore, it is necessary not to count the same page twice. This is the reason why the Control-D SMF record is not of type 6. The SMF record number is determined by installation parameter SMF. For more information about the format of the record, see the sample exit in the IOA SAMPEXIT library.</p> |
| CTDX007 | <p>This exit handles the problem of decollating reports that cannot be shown on the screen. Many sites use special character sets in reports that cannot be displayed on a screen but can be printed. It is possible under Control-D to decollate such reports by specifying the name of a translation table before the string in the WHEN statement. Under this method, the user types what the user can see, and decollation takes place using the actual nonstandard spool representation.</p>                                                                                                                                                                                                                                                                                                                                                                          |
| CTDX008 | <p>This exit is used to control the update of the Active Missions file. For details, review the <i>INCONTROL for z/OS Security Guide</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| CTDX009 | <p>Print job tailoring exit. This exit can modify the contents of the print job prepared by the Control-D print mission. For a description of printing mission workflow, see <a href="#">Control-D and Control-V</a> (on page 366).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTDX010 | Backup job tailoring exit. This exit can modify the contents of the backup job prepared by the Control-D backup mission. For a description of backup mission workflow, see <a href="#">Control-D and Control-V</a> (on page 366).                                                                                                                                                                                                                                                                                                                     |
| CTDX011 | Restore job tailoring exit. This exit can modify the contents of the restore job prepared by the Control-D restore mission. For a description of restore mission workflow, see <a href="#">Control-D and Control-V</a> (on page 366).                                                                                                                                                                                                                                                                                                                 |
| CTDX012 | Activated by utility CTDCAP. This exit allows the user to change the contents of the records that are copied from the Active User Report List file to the Permanent User Report List file. The exit can also suppress the copying of any record.                                                                                                                                                                                                                                                                                                      |
| CTDX013 | Activated by utility CTDCP2A. This exit allows the user to change the contents of the records that are copied from the Permanent User Report List file to the Active User Report List file. The exit can also suppress the copying of any record.                                                                                                                                                                                                                                                                                                     |
| CTDX014 | Immediate print request banner exit. Used to print banners on immediate print requests from the Online viewing facility. The exit is similar in function to Exit CTDX003 (for more details, see <a href="#">Tailoring Control-D Banner Exits</a> (on page 767).                                                                                                                                                                                                                                                                                       |
| CTDX015 | This exit receives every line to be printed by an immediate print request under the Online viewing facility. The exit can suppress the line, change its contents, and so on. It is similar in function to Exit CTDX005.                                                                                                                                                                                                                                                                                                                               |
| CTDX016 | This exit receives control during report decollation when a search is made in the Recipient Tree for a synonym that is identical to the recipient name found in the report (that is, when trying to identify the recipient of the page). The exit can determine whether they are equal or not. It is mainly used to define synonym ranges. For example: User BR129 must receive all postal codes from 10200 to 10399. For an example of the use of this exit, see the implementation hints chapter in the <i>Control-D and Control-V User Guide</i> . |
| CTDX017 | Exit is obsolete. Use exit IOAX034 instead. See <a href="#">IOA Exits</a> (on page 750).                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTDX018 | <p>This exit is activated when CDAM parameter EXIT=YES is specified. The exit, which should be in a LINKLIST concatenation, receives control for every line written to the CDAM file. For a description of the exit, see the CDAM chapter in the <i>Control-D and Control-V User Guide</i>.</p> <p>Note: If CTDX018 is not in the LINKLIST, the IOA LOAD would need to be in the steplib concatenation of every job that writes directly to CDAM.</p>                                                                        |
| CTDX019 | This exit is used to control the update of the Control-D/WebAccess Server Active Transfer file. For details, see the <i>INCONTROL for z/OS Security Guide</i> .                                                                                                                                                                                                                                                                                                                                                              |
| CTDX020 | This exit is invoked when the Print Plan file is built. It can modify the contents of print plan records before they are written to the print plan file.                                                                                                                                                                                                                                                                                                                                                                     |
| CTDX021 | This exit is activated before the Recipient Tree is displayed (Screen T). Based on the library name and Recipient Tree member name, the exit determines if the Recipient Tree is to be edited or browsed.                                                                                                                                                                                                                                                                                                                    |
| CTDX022 | This exit is invoked during decollation. It can be used to access default records in the Active or Permanent User files, to create user and SYSDATA records in the Active User file, to access each page of a report that is being decollated, or to access index values before they are added to the index file. When this exit is called, function INXMASK can be used to modify a mask value and function INXVAL can be used to "unify" index values by (for example) changing index values from mixed case to uppercase. |
| CTDX023 | User Exit CTDX023 is invoked by the file transfer monitor during each step that prepares and sends files. This exit can be used to designate the desired file transfer protocol. The default file transfer protocol is TCP/IP. Other supported protocols include XCOM 6.2. For more information see sample member CTDX023C in the IOA SAMPEXIT library that provides support for XCOM 6.2.                                                                                                                                   |

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTDX024 | <p>This exit is invoked by the Application server when a Control-D/Page On Demand (POD) request is processed. It can be called to control access to the Control-D Active User file and the Control-V Migrated User file from Control-D/Page On Demand. The mainframe logon user ID specified in the Control-D/WebAccess Server Communication Setup menu is passed to this exit.</p> <p>Security module CTDSE24 retrieves security definitions from the Recipient Tree. The administrator can authorize Control-D/Page On Demand users to view mainframe reports by adding the appropriate mainframe logon ID to the AUTHORIZE field in the recipient definitions in the Recipient Tree. For more information about this topic, see the documentation for Security Module CTDSE24.</p> |
| CTDX026 | This exit is invoked by the Control-D/Decollation Server Online environment under the T, M, A.Z and U.P screens.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| CTDX027 | Install the Control-D File Transfer option.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| CTVX001 | This exit is invoked during online processing of index files. It enables the user to retrieve index values from non-Control-V index files.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| CTVX002 | This exit is invoked by the IOASMON Archive Server before writing an SMF record.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Replacing Control-D User Exits

The Control-D monitor supports several user exits: CTDX007, CTDX010, CTDX011, and CTDX022.

To load a new copy of an exit without shutting down the Control-D monitor, simply enter the exit name using a modify command. For example

```
F CONTROLD,CTDX007
```

After a few seconds, the following message is displayed on the operator console from which the modify command was issued:

```
CTD126I NEW EXIT CTDX007 LOADED
```

In case of an error while loading the new copy of an exit, an appropriate message is displayed on the operator console (the original copy of the exit remains active).

## Tailoring Control-D Banner Exits

There are two banner exits under Control-D:

**Table 279 Control-D Banner Exits**

| Exit    | Description                                                                                                      |
|---------|------------------------------------------------------------------------------------------------------------------|
| CTDX003 | The deferred print (printing mission) banner exit.                                                               |
| CTDX014 | Immediate Print request banner exit. Used for printing banners on direct print requests of Online viewing users. |

The Control-D banner exits can be tailored for most sites without coding Assembler instructions (described later).

This topic discusses the following items:

- banner pages
- format of banner pages
- printing user address in bundle banner
- index printing control
- AFP (APA) support
- XEROX (DJDE) support
- initiating page marks
- global control of printing characteristics

## Banner Pages

The Control-D supplied banner exit prints different types of banner pages. Banners are defined in the library allocated to DD statement DABANNER of the Control-D Printers Control monitor, the Online monitor and of each Online user. A sample Control-D BANNERS library is supplied as part of the IOA installation. The following banners can be found in the library:

**Table 280      Sample Banners**

| Banner     | Description                                    |
|------------|------------------------------------------------|
| xxBNDLST   | Bundle Open banner                             |
| xxBNDLEN   | Bundle Close banner                            |
| xxUSERST   | Beginning of a User (Recipient) Reports banner |
| xxUSEREN   | End of a User (Recipient) Reports banner       |
| xxREPSTA   | Start of Report banner                         |
| xxREPEND   | End of Report banner                           |
| xxINDSTA   | Start of Index Report banner                   |
| xxINDEND   | End of Index Report banner                     |
| xxRPSSTA   | Start of Subscribed Report banner              |
| xxRPSEND   | End of Subscribed Report banner                |
| xxUIIDXH   | Header of Reports index                        |
| xxUIIDXV   | Format of each index line                      |
| \$\$ONLSTA | Start Banner of immediate print requests       |
| \$\$ONLEND | End banner of immediate print requests         |

The prefix of the banner members beginning with *xx* is determined by the type of printer used to print the report (Xerox, APA, Siemens, and so on), as follows:



**Table 281      Banner Prefixes**

| Type | Banner Prefix |
|------|---------------|
| REG  | \$\$          |
| LAS  | \$\$          |
| APA  | \$1           |
| XER  | \$2           |
| FOB  | \$3           |
| MAIL | \$M           |

If a banner member for a specific printer type is not found, the default banner member is used (for example, if \$1BNDLST is not found, default member \$\$BNDLST is used).

The type of the printer specified in the Control-D installation parameters (member CTDPARM in the IOA PARM library).

## Format of Banner Pages

The contents of each banner page is determined by the text that is found in the banner member. The following applies to printing banner pages.

The first character of each line can be the following:

**Table 282      Valid First Characters for Banner Page Lines**

| First Character     | Description and Valid Values                                                                                                                                                                                                                                                            |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Any valid ASA code. | Valid ASA codes include 1, +, -, and so on.                                                                                                                                                                                                                                             |
| X'5A' –             | AFP (Advanced Function Printing).                                                                                                                                                                                                                                                       |
| A line descriptor   | Valid line descriptors are: <ul style="list-style-type: none"> <li>▪ Blank - regular size letters</li> <li>▪ B - big (large) size letters</li> <li>▪ M - medium size letters</li> <li>▪ S - small size letters</li> <li>▪ E - end of banner page</li> <li>▪ C - comment line</li> </ul> |

You can use special variables, which are automatically replaced for each banner printed, within the banner page definition. The variables are:

**Table 283      Special Variables for Banner Page Definition**

| Variable   | Description                                                                                         |
|------------|-----------------------------------------------------------------------------------------------------|
| %MISSION%  | Printing mission name.<br>This variable applies to deferred print banners only.                     |
| %USER%     | User (recipient) name.                                                                              |
| %FATHER%   | Father of the recipient in the tree.                                                                |
| %REPORT%   | Report name.                                                                                        |
| %REPORTX%  | Extended report name.                                                                               |
| %CATEGORY% | Printing Mission category.                                                                          |
| %JOBNAME%  | Name of the job that produced the report.                                                           |
| %JOBID%    | Job ID (in JES) that created the report.                                                            |
| %DATE%     | Current date (at printing time).                                                                    |
| %TIME%     | Current time.                                                                                       |
| %ODATE%    | Original scheduling date of the report.                                                             |
| %PAGES%    | Number of pages (for each type of banner and for the index).                                        |
| %LINES%    | Number of lines (for each type of banner and for the index).                                        |
| %DEST%     | Printing (JES) destination.                                                                         |
| %LASTUSER% | Last user (used in END banners).                                                                    |
| %COPIES%   | Number of copies to be printed (for report banner and for the index).                               |
| %CURRCOP%  | Current printing copy (of the copies) (for report banner only).                                     |
| %FROMPAGE% | From page printed.                                                                                  |
| %TOPAGE%   | Until page printed.                                                                                 |
| %OUSER%    | Name of the user who requested the print.<br>This variable applies to immediate print banners only. |

| Variable           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| %FROMUSER%         | Name of the recipient from whom the report is received. The variable is applied to report banners only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| %REMARK%           | Decollation remark (in Active User List file).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| %REMARK2%          | Continuation of decollation remark (in Active User List file).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| %REMARK3%          | Continuation of decollation remark (in Active User List file).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| %RULER%            | Name of the ruler being used to print the report. (If no ruler is being used, no RULER is printed.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| %GROUP%            | Printing GROUP (from the printing mission definition).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| %GLOBAL <i>n</i> % | <p>The <i>n</i>th line of member \$\$GLOBAL (where <i>n</i> is an integer from 1 to 10).</p> <p>The Control-D Banners library contains member \$\$GLOBAL. This member can contain from 1 to 10 lines of data. When parameter %GLOBAL<i>n</i>% is specified in the banner page, the <i>n</i>th line from this member is placed in the banner page.</p> <p>This parameter can be used to distribute NEWS to all report recipients.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| %DATA <i>n</i> %   | <p>The <i>n</i>th line of a member whose name is identical to one of the following, depending on the value of the DATA parameter:</p> <ul style="list-style-type: none"> <li>the user name (not the synonym) in the Recipient Tree or the online UserID depending on the value of the ADDR parameter</li> <li>the first eight characters of the report's name</li> <li>the first eight characters of the report's REMARK field</li> </ul> <p>Valid values for <i>n</i> are: 1 to 10.</p> <p>The Control-D Banners library can contain a member for each report, report recipient, or online user. This member can contain from 1 to 10 lines of data. When the %DATA<i>n</i>% variable is specified, the <i>n</i>th line from the corresponding member is placed in the banner page. Control-D does not expect to find such a member for every user or report.</p> <p>This parameter can be used for special distribution instructions for a user or a report. For more information see sample members BМИAMI and UNIDENT in the BANNER library.</p> |

| Variable    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| %ADDRn%     | <p>The nth address line of the current user (recipient) in the tree. Valid values for <i>n</i>: 1 to 10.</p> <p>The Control-D Recipient Tree can contain address lines that can be inserted in the banner page of this user. Any text can be entered in these address lines. A maximum of ten address lines can be specified per user. Control-D does not expect to find such lines for each user.</p> <p>A common use of this parameter is for the user address, to which the bundle must be delivered.</p> <p>For performance reasons, BMC recommends that you use variable %ADDRn% instead of variable %DATAn% whenever possible because %ADDRn% data is located in memory and %DATA is in a library, member.</p> |
| %LASTADDRn% | Used in the End user banner to print the address of the last user, which has already printed. This variable is identical to %ADDRn% and is supported for backward compatibility.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## Replacing Control-M/Tape User Exits

The Control-M/Tape real time environment supports the following user exits:

- CTTX002
- CTTX003
- CTTX004
- CTTX005
- CTTX006
- CTTX009
- CTTX010

To load a new copy of an exit without shutting down Control-M/Tape, use the RELOAD command of CTTINIT.

```
S CTTINIT, PARM='RELOAD,EXIT=CTTX002'
```

After a few seconds, the following message is displayed on the operator console from which CTTINIT was invoked:

---

```
CTT810I Control-M/TAPE RELOAD CTTX002 ENDED. RC=00
```

---

In case of an error while loading the new copy of an exit, an appropriate message is displayed on the operator console (the original copy of the exit remains active).

## Printing User Address in Bundle Banner

Control-D can group the reports of several recipients into one bundle. In such cases, it can be desirable to have a specific address assigned to the entire bundle and to print this address on the bundle banner.

Control-D does this in the following way:

The contents of the GROUP field of the printing mission is compared with the Recipient Tree. If the GROUP field contains a user name from the tree (not a synonym), using the variable %ADDRn% in the bundle banner produces the address of this user.

## Eliminate Banners

If you want to suppress the printing of a certain banner type, simply rename the banner member in the BANNERS library. You can suppress the printing of User and/or Report Banners for all reports of a particular recipient using the Recipient Tree definition. For details, see the online facilities chapter in the *Control-D and Control-V User Guide*.

To suppress the printing of all Banners by a particular printing mission, specify in the printing mission CATEGORY field the special name NOBANNER. For details, see the chapter about printing missions in the *Control-D and Control-V User Guide*.

For more information, see the BANSEQ parameter in [Banner Printing Options](#) (on page 775).

## INDEX Printing Control

The title of the index is retrieved from member \$\$UINDXH in the BANNERS library. The format of each line of index is retrieved from member \$\$UINDXV in the BANNERS library.

If variable %COPIES% is used in the index, the printed value is the value before the actual print. If the copies count is changed during printing (for example, it was suppressed by a user exit), the correction is not shown on the index.

The following parameters can be specified in the CTDX003 banner exit to control the printing of indexes:

**Table 284 Parameters for Controlling Index Printing**

| Parameter | Description and Valid Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GINDEX    | <p>Specifies whether an index bundle contents (global index) must be printed at the beginning of a printing mission (after the bundle banner page). Valid values are:</p> <ul style="list-style-type: none"> <li>▪ ON - The global index is printed.</li> <li>▪ OFF - The global index is not printed.</li> </ul>                                                                                                                                                                                                                                                                     |
| INDEX     | <p>Optionally, it is possible to create a separate index for each user in the bundle. A bundle can contain reports for more than one user. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ ON - Each user receives an index at the beginning of each user bundle. However, if parameter INDEX in the Recipient Tree is equal to N (No), an index is not printed for this user.</li> <li>▪ OFF - An index is not produced for each user. However, if parameter INDEX in the Recipient Tree is equal to Y (Yes), an index is printed for this user.</li> </ul>           |
| LINECT    | <p>Specifies the maximum number of index records to be printed on a page. If LINECT=0 is specified there is no limit (that is, any number of records can be printed on a page).</p>                                                                                                                                                                                                                                                                                                                                                                                                   |
| EINDEX    | <p>Specifies whether an End User Index must be printed. An End User Index is an index printed at the end of a specific user's report bundle that indicates which reports were actually printed (that is, it does not include reports that were not printed) for that user. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) - End User Indexes are printed. However, if the INDEX parameter in the Recipient Tree is equal to N (No) or blank, an index is not printed for this user.</li> <li>▪ N (No or blank) - End User Indexes are not printed.</li> </ul> |
| GEINDEX   | <p>Specifies whether a Global End Index must be printed. The Global End Index contains an index of all reports that were actually printed in a report bundle. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y(Yes) - Print a Global End Index.</li> <li>▪ N (No or blank) - Do not print a Global End Index</li> </ul>                                                                                                                                                                                                                                               |

## Banner Printing Options

The following parameters in the banner exits (CTDX003 and CTDX014) are used to determine where, when, and how bundle banners are printed:

**Table 285 Parameters for Determining Where, When and How Bundle Banners Print**

| Parameter | Description and Valid Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BUNSEP    | <p>Specifies where bundle banners must be printed.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>Y (Yes) - The bundle start banner, bundle index, and bundle end banner are printed to the destination specified in the print mission.</li> </ul> <p>All other banners, indexes and reports are printed to the destination specified in the User Reports screen.</p> <p>For more information, see the DEST parameter in the online facilities chapter of the <i>Control-D and Control-V User Guide</i>.</p> <ul style="list-style-type: none"> <li>N (No) - All banners, indexes and reports are printed to the destination specified in the User Reports screen. For more information, see the DEST parameter in the online facilities chapter of the <i>Control-D and Control-V User Guide</i>.</li> </ul> <p><b>Note:</b> This parameter does not apply to immediate printing.</p> |
| BANSEQ    | <p>Specifies whether Control-D must print banners when printing to a sequential file instead of the JES SPOOL.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>Y (Yes) - Print banners when printing to a sequential file.</li> <li>N (No) - Do not print banners when printing to a sequential file.</li> </ul> <p><b>Note:</b> This parameter does not apply to immediate printing.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| BANAFP    | <p>Specifies whether to implement PAGEDEF, FORMDEF and OUTPUT statements when printing banners for the report. These statements can be included either with the PRINT and CDAM parameters for this report, or in the OUTPARMS library. For a description of the OUTPARMS library, see <a href="#">Control-D and Control-V</a> (on page 366).</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>Y (Yes) - Implement these statements when printing banners for the relevant report.</li> <li>N (No or blank) - Do not implement these statements when printing banners for the relevant report. Default.</li> </ul>                                                                                                                                                                                                                                                                        |

| Parameter | Description and Valid Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR      | <p>Specifies whether the %ADDRN% and %DATAN% values of the on-line user that requested the report to be printed, or the %ADDRN% and %DATAN% values of the Recipient Tree recipient to which the report is sent, are printed in the report banners.</p> <p>%DATAN% values are retrieved using the DATA parameter.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>▪ USER - The %ADDRN% and %DATAN% values of the recipient from the Recipient Tree are printed.</li> <li>▪ OUSER - The %ADDRN% and %DATAN% values of the on-line user that requested the report to print are printed.</li> </ul> <p><b>Note:</b> This parameter does not apply to immediate printing.</p> |
| DATA      | <p>Specifies the search method used for searching the BANNERS library when searching for a member containing the %DATA1% through %DATA10% lines.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>▪ USER - The library is searched by user (recipient) name. Default.</li> <li>▪ REPN - The library is searched for the first 8 characters of the report name.</li> <li>▪ REMK - The library is searched for the first 8 characters of the report's REMARK field.</li> </ul> <p><b>Note:</b> Within immediate printing, the library is searched on by the recipient name or by the on-line UserID depending on parameter ADDR.</p>                                        |



## OUTPARM Options

The OUTPARM options provide the ability to override the default printing characteristics (specified at decollation time) for all (or some) of the reports and banners to be printed by Control-D. To activate this feature, add the following parameters to the banner exits (CTDX003 and CTDX014):

**Table 286 Parameters for Overriding Default Printing Characteristics (OUTPARM)**

| Parameter              | Description and Valid Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OUTPARM=( <i>m,n</i> ) | <p>The first subparameter, <i>m</i>, specifies whether all the members in the Control-D OUTPARMS library refer to job names, user IDs, print missions' names, or to reports' destinations. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ JOB – The members in the OUTPARMS library refer to job names.</li> <li>▪ USER – The members in the OUTPARMS library refer to user names.</li> <li>▪ PMIS – The members in the OUTPARMS library refer to print mission names.</li> <li>▪ DEST – The members in the OUTPARMS library refer to report destinations.</li> </ul> <p>The second subparameter, <i>n</i>, specifies whether search patterns on the identification lines refer to reports' names or to external writers' names. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ REPORT – The search patterns refer to report names.</li> <li>▪ WRITER – The search patterns refer to external writer names.</li> </ul> |
| BANNER                 | <p>Specifies whether banners must be printed with the characteristics specified for reports in the OUTPARMS library. Valid values are:</p> <ul style="list-style-type: none"> <li>▪ Y (Yes) – Banners are printed with these characteristics.</li> <li>▪ N (No) – Banners are not be printed with these characteristics.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

For more information, see [Control-D and Control-V](#) (on page 366).

## AFP (APA) Support

For an explanation of how Control-D supports AFP (APA) printers, see [Control-D and Control-V](#) (on page 366) and the chapter about decollating mission parameters in the *Control-D and Control-V User Guide*. When you are using AFP (APA) printers, the banner exit invokes a special routine called CTDAPA.

## XEROX (DJDE) Support

For information about how Control-D supports XEROX (DJDE) printers, see [Control-D and Control-V](#) (on page 366). When you are using XEROX printers, the banner exit invokes a special routine called CTDDJDE. The source of this routine is in the IOA SAMPEXIT library.

## Summary

By using various line types and special variables, it is possible to tailor the format of banner pages for most sites without modifying the banner exit itself. However, it is also possible to tailor the banner exit.

If the supplied banner exit does not fit your requirements, you can modify the exit to conform with your special requirements. If you do so, you should inform your INCONTROL representative about any such modifications. These modifications may be implemented as a standard in a future version.

## Control-M/Analyzer Exits

The following table describes the available Control-M/Analyzer exits:

**Table 287 Control-M/Analyzer Exits**

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                           |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTBX001 | Receives control for every mission order that must be placed in the Active Balancing file. For further details, see the <i>INCONTROL for z/OS Security Guide</i> .                                                                                                                                                                                                                    |
| CTBX003 | Control-M/Analyzer database exit. Controls all access (for read, write, or update) to Control-M/Analyzer database files (group file, basic variable definitions files and variable generation files).                                                                                                                                                                                 |
| CTBX004 | Control-M/Analyzer Rule Activity file selection exit. This exit controls which users can see Control-M/Analyzer invocations on the Rule Activity screen.                                                                                                                                                                                                                              |
| CTBX008 | This exit is used to control access to the Active Balancing file. For example, the exit checks if a user is authorized to delete a mission using the Active Balancing Environment screen. For further details, see the <i>INCONTROL for z/OS Security Guide</i> .                                                                                                                     |
| CTBX009 | This exit receives control for every message issued by the Control-M/Analyzer Shout facility. It can modify the message text, change its destination or suppress it. It can also be used for special purposes, such as an interface to InfoMan or to Electronic Mail Systems.                                                                                                         |
| CTBX010 | Extract user-defined processing exit. This exit is used to process extracted information according to user-defined specifications during processing of a DO EXTRACT statement. For more information on extract processing, see the DO EXTRACT statement in the rule definitions chapter of the <i>Control-M/Analyzer User Guide</i> , and member CTBX010 in the IOA SAMPEXIT library. |

| Exit    | Description                                                                                                                                                                                                                                                |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTBX011 | This exit processes each line outputted by the Control-M/Analyzer DO PRINT statement before its contents are actually written as output.                                                                                                                   |
| CTBX014 | This exit is invoked by Control-M/Analyzer during WHEN statement processing. It receives control for each line scanned by the STRING search string before the search is performed. The search criteria of the exit can be changed according to user needs. |

## Control-M/Tape Exits

The following table describes the available Control-M/Tape exits.

**Table 288 Control-M/Tape Exits**

| Exit    | Description                                                                                                                                                                                                                                                                                                        |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTTX001 | Receives control for every Control-M/Tape rule that is loaded during initialization. This exit can be used to modify rule parameters. Security module CTTSE01 is associated with this exit. For more information on this security module, see the <i>INCONTROL for z/OS Security Guide</i> .                       |
| CTTX002 | Dynamic stacking exit. Receives control when the CTTSTK utility is executed, when dynamic stacking for a dataset must be performed, and when a new dataset is added to the Media Database.                                                                                                                         |
| CTTX003 | SVC operation decision. Receives control at dataset open and can determine the process of this open request. The exit has an associated security module CTTSE03.                                                                                                                                                   |
| CTTX004 | Dynamic definition exit. Receives control when a dataset or volume is to be dynamically defined to the Media Database. The exit has an associated security module CTTSE04.                                                                                                                                         |
| CTTX005 | Abend exit. When Control-M/Tape is about to abend a job, this exit receives control and determines whether to allow the job to abend or to bypass Control-M/Tape.<br><br>If you decide to implement this exit, do so with extreme caution. If you bypass Control-M/Tape, tape protection is disabled for this job. |
| CTTX006 | Media Database update validation. Receives control when a request to update the Media Database is received. Security Module CTTSE06 is associated with this exit.                                                                                                                                                  |

| Exit    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTTX007 | Cycle processing exit. Receives control whenever the CTTRTM utility or CTTVTM processes a cyclic dataset. The exit can determine the processing parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| CTTX008 | Robotic Tape library interface confirmation exit. Receives control before a request is made to the Robotic Library routine and before a retry is initiated for a request after a failure. The exit can allow or reject the request and can modify the maximum number of retries allowed for a request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CTTX009 | External label printing. Receives control either from the Control-M/Tape SVC (using statement DO LABEL) during dataset creation, or from the Online environment (Screen TI or TC) by specific request. It can be used to format label structure and contents and/or specify whether to print labels. Security module CTTSE09 is associated with this exit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| CTTX010 | Receives control when the Dynamic Dataset Stacking facility scans the Media Database for a stackable volume. This exit can be used to change search decisions (that is, to Reject or Accept a volume) or to supply a new volume to be used for stacking.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| CTTX011 | <p>Enhances the functionality of the CTTSBD utility by allowing placement of output files to be dependent on stacking criteria that cannot be specified using utility parameters (for example, security constants). Information passed to this exit describes the input dataset name, the candidate output volume, and the datasets already residing on the output volume chain being considered as a location for the output dataset.</p> <p>This exit examines the information provided and allows placement of the output dataset on the candidate output volume, rejects placement of the output dataset on the candidate output volume, forces placement of the output dataset on a scratch volume, grants the candidate output volume preferred status, or passes (that is, the exit does not influence CTTSBD processing).</p> |
| IOAX038 | Determination of execution environment for IOA functions. This exit can be used to specify which Functional monitor is to be used to perform particular IOA functions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## Control-O Exits

The following table describes the available Control-O exits:

**Table 289      Control-O Exits**

| Exit    | Description                                                                                                                                           |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| CTOX001 | Receives control under the Online interface whenever rule ORDER/FORCE is performed.                                                                   |
| CTOX002 | Receives control for every rule before it is loaded to the active environment. This exit can be used to modify rule parameters prior to rule loading. |
| TOX003  | Receives control before execution of each DO KSL/TSO statement. This exit can be used to modify specific requests.                                    |
| CTOX004 | Receives control each time a user enters an Automation Options screen or attempts to perform an action in an Automation Options screen.               |
| CTOX008 | Receives control each time a user enters the Rule Status screen or attempts to perform operations in the Rule Status screen.                          |
| CTOX015 | This exit is invoked before the execution of a request to use the Control-O XAM interface. If necessary, the exit rejects or modifies the request.    |

## A INCONTROL Application Program Names

The following table describes the application program names that are contained in INCONTROL product tapes:

**Table 290 INCONTROL Product Application Programs**

| Name    | Description                                                                         |
|---------|-------------------------------------------------------------------------------------|
| CTBTABS | Control-M/Analyzer Active Balancing Environment screen                              |
| CTBTBAL | Control-M/Analyzer Balancing Mission Definition screen                              |
| CTBTDAT | Control-M/Analyzer Database Variables Definition screen                             |
| CTBTJBL | Control-M/Analyzer Rule Activity screen                                             |
| CTBTRLB | Control-M/Analyzer Rule Definition screen                                           |
| CTDTAMS | Control-D Active Missions screen                                                    |
| CTDTATF | Control-D/WebAccess Server File Transfer Control screen                             |
| CTDTPDC | Control-D File Transfer screen                                                      |
| CTDTMIS | Control-D and Control-V Migration/Printing/Backup/Restore Mission Definition screen |
| CTDTREP | Control-D Report Decollating/Indexing Definition screen                             |
| CTDTUSR | Control-D User Reports screen (Online Report Viewing)                               |
| CTDTUTR | Control-D Recipient Tree screen                                                     |
| CTMTDTM | IOA Calendar screen                                                                 |
| CTMTNRS | IOA Manual Conditions screen                                                        |
| CTMTRES | IOA Conditions/Resources screen                                                     |
| CTMTSCH | Control-M Online Scheduling                                                         |
| CTMTRCM | CMEM Definition facility                                                            |
| CTMTACT | Control-M Active Environment screen                                                 |

| Name    | Description                                    |
|---------|------------------------------------------------|
| CTMTTSO | IOA TSO Command Processor screen               |
| CTOTARF | Control-O Rule Status screen                   |
| CTOTCMN | Control-O/COSMOS.                              |
| CTOTMSC | Control-O Message Statistics screen            |
| CTOTOMP | Control-O Rule Definition screen               |
| CTOTALO | Control-O Automation Log                       |
| CTOTAOP | Control-O Automation Options                   |
| CTOTDAT | IOA Variable Definition screen                 |
| CTTTRL  | Control-M/Tape Rule Definition screen          |
| CTTTPLD | Control-M/Tape Pool Definition screen          |
| CTTTVLD | Control-M/Tape Vault Definition screen         |
| CTTTINQ | Control-M/Tape Inquire/Update screen           |
| CTTTKIN | Control-M/Tape External Volume Check-In screen |
| IOAIUTI | IOA Utilities screen                           |
| IOATLOG | IOA Log screen                                 |
| IOATMNU | IOA Primary Option menu                        |

## B Dataset Formatting Jobs for INCONTROL Products

This section describes members that are ISPF skeletons. These members can be used to create, allocate, and/or format INCONTROL product datasets.

The recommended method to recreate the datasets is to use the INCONTROL Installation and Customization Engine (ICE) Customization activity for that particular product.

An alternative method is by using the TAILOR JOB option in the INCONTROL Installation and Customization Engine (ICE), available by selecting Maintain your Environment => ICE refresh.

**Table 291 IOA Dataset Formatting Utilities**

| Name     | Description                                                          |
|----------|----------------------------------------------------------------------|
| FORMCND  | IOA Conditions file                                                  |
| FORMDCND | IOA Mirror (Dual) Conditions file.                                   |
| FORMIOA  | All IOA files                                                        |
| FORMM2G  | Communications file for ESCGATE                                      |
| FORMLOG  | IOA Log file                                                         |
| FORMNRS  | IOA Manual Conditions file                                           |
| INSTFMON | IOA Checkpoint file for IOA functional monitors                      |
| IOADBDBS | Allocates and formats the IOA Variable Database database file (DBS). |
| IOADBCOL | Allocates and formats the IOA Variable Database Column file (COL)    |
| IOADBVAR | Allocates and formats the IOA Variable Database Variable file (VAR)  |



**Table 292 Control-M Dataset Formatting Utilities**

| Name     | Description                                                           |
|----------|-----------------------------------------------------------------------|
| FORMCKP  | Control-M Active Jobs file and its backup file                        |
| FORMCTM  | All Control-M files                                                   |
| FORMDCKP | Control-M Mirror (Dual) Active Jobs file                              |
| FORMG2M  | Control-M Gateway Communications file                                 |
| FORMGRF  | Control-M Dependencies file                                           |
| FORMHST  | Control-M History Active Jobs file                                    |
| FORMJRN  | Control-M/IOA Journal files                                           |
| FORMRES  | Control-M Resources file                                              |
| FORMSTT  | Control-M Job Execution Statistics file                               |
| FORMSUB1 | Control-M CMEM Monitor-to-Subsystem file format                       |
| FORMSUB2 | Control-M CMEM Subsystem-to-Monitor file format                       |
| FORMSUB3 | Control-M CMEM Monitor-to-Subsystem file update (to add a new system) |

**Table 293 Control-D Dataset Formatting Utilities**

| Name    | Description                                                         |
|---------|---------------------------------------------------------------------|
| FORMAMF | Control-D Active Missions file and its backup file                  |
| FORMATF | Control-D Active Transfer file for Control-D/WebAccess Server       |
| FORMBTR | Control-D Bundle Tracking file                                      |
| FORMCAT | IOA user catalog created for CDAM files                             |
| FORMCOM | Control-D Communication file                                        |
| FORMCTD | All Control-D files                                                 |
| FORMPGC | File that saves the number of pages prepared for all print missions |
| FORMUFA | Control-D Active User file                                          |
| FORMUFH | Control-D History file                                              |

| Name    | Description                                                    |
|---------|----------------------------------------------------------------|
| FORMUFP | Control-D Permanent file                                       |
| FORMUF2 | All Control-D User Report files formatted without reallocating |

**Table 294 Control-V Dataset Formatting Utilities**

| Name    | Description                                                       |
|---------|-------------------------------------------------------------------|
| FORMCTV | Allocates and formats Control-V Migration and Global Index files. |
| FORMUFM | Allocates and formats Control-V Migrated User Reports file.       |
| FORMUFG | Allocates and formats Control-V Global Index file.                |
| FORMUF4 | Formats Control-V files without reallocating.                     |

**Table 295 Control-O Dataset Formatting Utilities**

| Name     | Description                                                                |
|----------|----------------------------------------------------------------------------|
| DEFGLOB  | Allocates and formats Global Variables library and allocates a backup file |
| DEFSTATO | Allocates and formats Message Statistics file.                             |
| DEFALO   | Allocates and formats Automation Log file.                                 |

**Table 296 Control-M/Tape Dataset Formatting Utilities**

| Name    | Description                                                     |
|---------|-----------------------------------------------------------------|
| CTTCMDB | Allocates and formats Control-M/Tape Media Database (MDB) file. |
| CTTCSTK | Allocates and formats Control-M/Tape Stacking Database          |
| CTTCTRC | Allocates and formats Control-M/Tape Trace file.                |

## C Modifying IOA Online Facility Commands

Every screen of the IOA Online facility supports a set of commands. You can change the names of these commands or create synonyms. The command members reside in the IOAENV library, and the modified members must reside in the IOA PARM library. The members are named according to the following conventions:

**Table 297 Relevant Members**

| Member   | Description                                                               |
|----------|---------------------------------------------------------------------------|
| TxxxCMD1 | The active commands member.                                               |
| TxxxCMDD | Debugging aid member – contains additional commands for problem analysis. |

where *xxx* is the screen identifier. For a detailed description of how to modify a command member, see [IOA Administration](#) (on page 35).

A command member is composed of one header line and any number of command lines. The number at the left of the header line is the total number of command lines in the member. It must be updated when lines from the command member are added or deleted.

The structure of the command line is as follows:

**Table 298 Command Line Structure**

| Column | Description                                                                               |
|--------|-------------------------------------------------------------------------------------------|
| 1–8    | Command name.                                                                             |
| 25–28  | Reserved hexadecimal (unprintable) value. Do not change it.                               |
| 29–68  | Description of the command.                                                               |
| 69–72  | Reserved hexadecimal (unprintable) value – the internal command member. Do not change it. |

You can change the command name and description. To add a synonym, duplicate the command line, modify the command name on the duplicated line and modify the command line counter at the left side of the header line.

## Modifying IOA Online Facility PFKey Definitions

Every screen of the IOA Online facility has a set of PFKeys with pre-assigned commands. It is possible to change these PFKey definitions. The PFKey members reside in the IOA IAOENV library, and the modified members must reside in the IOA PARM library.

The members are named according to the following convention:

TxxxPF1

where *xxx* is the screen identifier.

A PFKey member is composed of one header line and any number of PFKey definition lines.

The structure of the PFKey definition line is as follows:

**Table 299 PFKey Definition Line Structure**

| Column | Description                    |
|--------|--------------------------------|
| 1–8    | The PFKey or Enter.            |
| 9–22   | Command assigned to the PFKey. |

At least one PFKey or Enter key must be defined as the ENTER command.

## D Logical Field Names for the Control-M/Tape Repository

The tables in this section list fields that can be

- specified in utility INCLUDE/EXCLUDE statements to determine which records are processed when the utility runs

For a complete explanation of INCLUDE/EXCLUDE statements, see the Control-M/Tape utilities chapter in the *INCONTROL for z/OS Utilities Guide*.

- manually updated in the Media Database with the CTTMUP utility
- included in utility-generated reports

These tables specify field names according to record type. Each table contains data for every field.

**Table 300 Field Names According to Record Type**

| Field         | Description and Valid Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| External Name | <p>Field name as specified by the user. Either of two types of data can be specified. Valid values:</p> <p>Keyword value - Specific valid values. Shown in uppercase (for example, CYCLE, DATE, JCL). Non-trivial values are accompanied by a description in the Description column of the table.</p> <p>Value type - Shown in lowercase (for example, char, integer, date). The following table describes these value types. If relevant, the maximum length of the value is displayed in parentheses next to the value type.</p> <p>Note: Hexadecimal values must be prefixed with an X (for example, DVL RBA=X01234567 instead of DVL RBA=01234567) except in relation to VER and REP fields.</p> |
| Description   | Brief description of the field. This column also contains a description of any specific values specified in the Valid Values column.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Internal Name | Name used in the macro to reference the field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

The following table briefly describes the value types that can be specified in the Valid Values column:

**Table 301 Value Types in the Valid Values Column**

| Type         | Description                                                                                                                                                                                                                                                                                                                                                           |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| hex          | Hexadecimal character format (valid characters: 0 through 9, A through F). Maximum length indicated in parentheses.                                                                                                                                                                                                                                                   |
| date         | Valid formats are: yymmdd or yyyyymmdd. The following keywords are also valid: <ul style="list-style-type: none"> <li>▪ %CDAY - Current day (today).</li> <li>▪ %PDAY - Previous day (yesterday).</li> <li>▪ %NDAY - Next day (tomorrow).</li> <li>▪ %PWEEK - Previous week.</li> <li>▪ %NWEEK - Next week.</li> <li>▪ %PMONTH - Previous month (30 days).</li> </ul> |
| char         | Free character format. Maximum length indicated in parentheses. The specified character string can include masking characters. For more information about masking characters, see the online facilities chapter in the <i>Control-M/Tape User Guide</i> .<br>%NMONTH - Next month (30 days).                                                                          |
| time         | The valid format is hhmmss.                                                                                                                                                                                                                                                                                                                                           |
| julian date  | Valid formats are yyddd or yyyyddd. Special values (for example, 98000, 99000) are also supported.                                                                                                                                                                                                                                                                    |
| integer      | Numeric value.                                                                                                                                                                                                                                                                                                                                                        |
| date/integer | Either a date value or an integer value can be specified. Date values must be prefixed by D (for example, format Dyyyyymmdd). Integer values must be prefixed by I (for example, I35). By default (that is, if no prefix is specified), the value is assumed to be a date.                                                                                            |

The foregoing values can be used in the following table types:

- [Dataset record table](#) (on page [791](#))
- [Volume record table](#) (on page [796](#))
- [Stacking record tables](#) (on page [802](#))
- [Trace record tables](#) (on page [804](#))
- [SMF record table](#) (on page [806](#))

## Dataset record table

The following table describes the fields of dataset records:

**Table 302 Keywords Used With Dataset Type Records**

| EXTERNAL NAME | VALID VALUES | DESCRIPTION                                   | INTERNAL NAME |
|---------------|--------------|-----------------------------------------------|---------------|
| ACCOUNT       | char (50)    | Job's accounting information                  | DDSACCT       |
| BLKSIZE       | integer      | Dataset's block size                          | DDSBLK        |
| BLOCKCT       | integer      | Block count                                   | DDSBLKC       |
| CRECC         | char (4)     | Condition code of creating step               | DDSCCC        |
| CRECPU        | char (4)     | CPU in which dataset was created              | DDSCCPU       |
| CREDDN        | char (8)     | Creating DD name                              | DDSCDDN       |
| CREDIT        | date         | Creation date                                 | DDSCDT        |
| CREJBN        | char (8)     | Creating job name                             | DDSCJBN       |
| CREJOBID      | char (8)     | Creating job ID (format JOBxxxxx)             | DDSCJID       |
| CREPGM        | char (8)     | Creating program name                         | DDSCPGM       |
| CRESTEP       | char (8)     | Creating step name                            | DDSCSTP       |
| CRETM         | time         | Creation time                                 | DDSCTM        |
| CREUAD        | hex (4)      | Unit address on which the dataset was created | DDSCUAD       |
| CREUSER       | char (8)     | User ID that created the dataset              | DDSCUSER      |
| DCHANGED      | date         | Last change date                              | DDSMdT        |
| DCHANGET      | time         | Last change time                              | DDSMtM        |
| DCHANGEU      | char (8)     | Last user ID that changed the entry           | DDSLUSER      |
| DDSRBA        | hex(8)       | Record's RBA                                  | DDSRBA        |
| DSCSIZE       | integer      | Compressed size in kilobytes                  | DDSCSIZE      |
| DSEDSIZE      | integer      | Ending size in kilobytes on the volume        | DDSECSIZE     |

| EXTERNAL NAME        | VALID VALUES                                                                          | DESCRIPTION                                                                                                                                                                                                                                                                               | INTERNAL NAME |
|----------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| DSEXCP               | integer                                                                               | EXCP count since dataset was created                                                                                                                                                                                                                                                      | DDSEXCP#      |
| DSEXPDT              | date/integer                                                                          | Dataset's expiration date, number of cycles or number of days according to DSEXPTYP                                                                                                                                                                                                       | DDSEXPDT1     |
| DSEXPTYP             | CYCLE<br>DATE<br>EDM<br>LACCS<br><br>CATALOG<br>PERM<br>VLTRET<br>SMS                 | Dataset's expiration type:<br>Number of cycles<br>Actual date<br>EDM controlled<br>Number of days since last accessed<br>MVS Catalog Control<br>Permanent dataset<br>Controlled by vaulting<br>Controlled by SMS Management Class                                                         | DDSEXPT1      |
| DSFLAGS <sup>a</sup> | DISPMOD<br>DYNDEF<br>RECREATE<br>MANUPDAT<br><br>JCLRETPD<br><br>DELRTM<br><br>DSRSTR | Dataset flag byte:<br>Dataset opened with DISP=MOD<br>Dataset dynamically defined<br>Dataset recreated<br>Dataset manually updated (Online/Utility CTTMUP)<br>RETPD specified in the JCL for the dataset<br>Dataset marked to be deleted by CTTRTM<br>Dataset processed under MVS RESTART | DDSFLG1       |
| DSFLAG2 (b)          | GRACECAT GRACECYC                                                                     | Additional status flag: Dataset retention was extended based on catalog grace period Dataset retention was extended based on cycle grace period                                                                                                                                           | DDSFLG2       |
| DSLABEL              | integer                                                                               | Dataset label number                                                                                                                                                                                                                                                                      | DDSLBLNM      |
| DSNAME               | char (44)                                                                             | Dataset name                                                                                                                                                                                                                                                                              | DDSDSN        |



| EXTERNAL NAME       | VALID VALUES                                                                     | DESCRIPTION                                                                                                                                                                                           | INTERNAL NAME |
|---------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| DSPOS               | hex (4)                                                                          | Block ID of current dataset Header1 block                                                                                                                                                             | DDSPOS        |
| DSSIZE              | integer                                                                          | Uncompressed size in kilobytes                                                                                                                                                                        | DDSUSIZE      |
| DSSTAT <sup>a</sup> | DACTIVE<br>DINUSE<br>DPENDSCR<br>DSCRATCH<br>DSTACKED<br>DEDM<br>DABEND<br>DNSTK | Dataset status:<br>Active dataset<br>In-use dataset<br>Pending scratch dataset<br>Scratched dataset<br>Stacked dataset<br>EDM controlled dataset<br>Closed under abend dataset<br>Unstackable dataset | DDSSTAT       |
| DSTKGRP             | char(8)                                                                          | Dataset Stacking Group                                                                                                                                                                                | DDSSTKG       |
| DSUSECT             | integer                                                                          | Dataset usage count                                                                                                                                                                                   | DDSUSED#      |
| DSVOLSER            | char (6)                                                                         | Dataset's first volume                                                                                                                                                                                | DDSVOLSR      |
| DUSRDATA            | char (20)                                                                        | User data                                                                                                                                                                                             | DDUSER2       |
| JCLEXPDT            | Julian date                                                                      | JCL EXPDT value                                                                                                                                                                                       | DDSJEXPD      |
| LASTACCS            | C, R, W                                                                          | Last access type (create, read, write)                                                                                                                                                                | DDSLACS       |
| LRECL               | integer                                                                          | Dataset logical record length                                                                                                                                                                         | DDSRECL       |
| READCPU             | char (4)                                                                         | CPU in which dataset was last read                                                                                                                                                                    | DDSRCPU       |
| READDDN             | char (8)                                                                         | Last read DD name                                                                                                                                                                                     | DDSRDDN       |
| READDT              | date                                                                             | Last read date                                                                                                                                                                                        | DDSRDT        |
| READJBN             | char (8)                                                                         | Name of the last job that read the dataset                                                                                                                                                            | DDSRJBN       |
| READPGM             | char (8)                                                                         | Name of last program that read the dataset                                                                                                                                                            | DDSRPGM       |

| EXTERNAL NAME | VALID VALUES                                         | DESCRIPTION                                     | INTERNAL NAME |
|---------------|------------------------------------------------------|-------------------------------------------------|---------------|
| READSTEP      | char (8)                                             | Name of the last step that read the dataset     | DDSRSTP       |
| READTM        | time                                                 | Last read time                                  | DDSRMT        |
| READUAD       | hex (4)                                              | Unit address on which the dataset was last read | DDSRUAD       |
| RECFM         | U, F, FB, FBA, FBM, FBS, V, VB, VS, VBA, VBM, VBS, D | Dataset's record format                         | DDSRFCFM      |
| RFORMAT       | Recording format of the data on the volume           |                                                 | DDSRFMT       |
|               | BPI200                                               | 200 bits per inch                               |               |
|               | BPI556                                               | 556 bits per inch                               |               |
|               | BPI800                                               | 800 bits per inch                               |               |
|               | BPI1600                                              | 1600 bits per inch                              |               |
|               | BPI6250                                              | 1625 bits per inch                              |               |
|               | TRACK18                                              | 18 tracks                                       |               |
|               | TRACK36                                              | 36 tracks                                       |               |
|               | TRACK128                                             | 128 tracks                                      |               |
|               | TRACK256                                             | 256 tracks                                      |               |
|               | TRACK384                                             | 384 tracks                                      |               |
|               | EFMT1                                                | Enterprise Recording Format 1                   |               |

| EXTERNAL NAME | VALID VALUES                                                                                     | DESCRIPTION                                                                                                                                                                                                                                                       | INTERNAL NAME |
|---------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| RTNFROM       | DEFAULT<br>JCL<br>RULE<br>SMS<br><br>SMSDFLT<br>SMSLIMIT<br>SMSJCL<br>CTTMUP<br>CHKIN<br>ONLUPD. | Dataset Retention origin:<br>From CTTPARM<br>From JCL<br>From Control-M/Tape rules<br>From SMS Management Class<br>From SMS default<br>From SMS limit<br>From SMS JCL<br><br>Updated by utility CTTMUP<br>External Volume Check-In (TC Screen)<br>Online facility | DDSRORG       |
| SMSMC         | char (8)                                                                                         | SMS Management Class                                                                                                                                                                                                                                              | DDSSMCL       |
| TRTCH         | COMP, NOCOMP                                                                                     | Indication of whether the data is compressed (for example, IDRC)                                                                                                                                                                                                  | DDSTRTCH      |
| VOLSNUM       | integer                                                                                          | Number of volumes on which the dataset resides (multi-volume dataset)                                                                                                                                                                                             | DDSVOLS#      |
| WRITECCC      | char (4)                                                                                         | Condition code of the last step that wrote to the dataset                                                                                                                                                                                                         | DDSWCC        |
| WRITECPU      | char (4)                                                                                         | CPU in which the dataset was last written                                                                                                                                                                                                                         | DDSWCPU       |
| WRITEDDN      | char (8)                                                                                         | Last write DD name                                                                                                                                                                                                                                                | DDSWDDN       |
| WRITEDT       | date                                                                                             | Last write date                                                                                                                                                                                                                                                   | DDSWDT        |
| WRITEJBN      | char (8)                                                                                         | Name of the last job that wrote to the dataset                                                                                                                                                                                                                    | DDSWJBN       |
| WRITEPGM      | char (8)                                                                                         | Name of last program that wrote to the dataset                                                                                                                                                                                                                    | DDSWPGM       |
| WRITESTP      | char (8)                                                                                         | Name of the last step that wrote to the dataset                                                                                                                                                                                                                   | DDSWSTP       |
| WRITETM       | time                                                                                             | Last write time                                                                                                                                                                                                                                                   | DDSWTM        |

| EXTERNAL NAME | VALID VALUES | DESCRIPTION                                        | INTERNAL NAME |
|---------------|--------------|----------------------------------------------------|---------------|
| WRITEUAD      | hex (4)      | Unit address on which the dataset was last written | DDSWUAD       |

<sup>a</sup> This field can be used normally in INCLUDE/EXCLUDE statements of a report. It cannot, however, be used in a report's FIELDS and SORTBY statements; use fields DSSTAT and DSTATX instead. For more information, see the CTRPT utility in the *INCONTROL for z/OS Utilities Guide*.

<sup>b</sup> This field has a special meaning when used in the FIELDS and SORTBY statements of a report. For more information, see the CTRPT utility in the *INCONTROL for z/OS Utilities Guide*.

## Volume record table

The following table describes the fields of volume records:

**Table 303 Keywords Used With Volume Type Records**

| EXTERNAL NAME | VALID VALUES | DESCRIPTION                                  | INTERNAL NAME |
|---------------|--------------|----------------------------------------------|---------------|
| ACTIVEDS      | integer      | Number of active datasets                    | DVLACTD#      |
| BOXID         | char (6)     | Box ID                                       | DVLBOXID      |
| CHKINDT       | date         | Check-in date                                | DVLFCDT       |
| CLNCOUNT      | integer      | Volume's Clean Count                         | DVLCN#        |
| DVLRBA        | hex (8)      | RBA of the record                            | DVLRBA        |
| EXPDSNUM      | integer      | Expiration dataset number                    | DVLEXPDS      |
| EXPRTRN       | date         | Expected return date from out location       | DVLRTRN       |
| FIRSTVOL      | char (6)     | First volser for multi-volume chains         | DVLFIRST      |
| IOERPRM       | integer      | Read permanent errors count                  | DVLRPER       |
| IOERPRMC      | integer      | Read permanent errors count since last clean | DVLRPERC      |
| IOERTMP       | integer      | Read temporary errors count                  | DVLRTER       |
| IOERTMPC      | integer      | Read temporary errors count since last clean | DVLRTERC      |

| EXTERNAL NAME | VALID VALUES                   | DESCRIPTION                                                    | INTERNAL NAME |
|---------------|--------------------------------|----------------------------------------------------------------|---------------|
| IOEWPRM       | integer                        | Write permanent errors count                                   | DVLWPER       |
| IOEWPRMC      | integer                        | Write permanent errors count since last clean                  | DVLWPERC      |
| IOEWTMP       | integer                        | Write temporary errors count                                   | DVLWTER       |
| IOEWTMPC      | integer                        | Write temporary errors count since last clean                  | DVLWTERC      |
| LACCDT        | date                           | Date of last volume access                                     | DVLADT        |
| LACCJBN       | char (8)                       | Name of last job that accessed the volume                      | DVLJBN        |
| LACCTM        | time                           | Time of last volume access                                     | DVLATM        |
| LBLNUM        | integer                        | Last label number on the volume                                | DVLLBLNM      |
| LBLTYP        | SL, NL, NSL, SUL, AL, AUL, BLP | Label type                                                     | DVLLTYP       |
| LCLNDT        | date                           | Last clean date                                                | DVLCN         |
| LDSCSIZE      | integer                        | Compressed size in kilobytes of the last dataset on the volume | DVLLDCSZ      |
| LDSPPOS       | hex (4)                        | Block ID of the last dataset starting on this tape             | DVLPOS        |
| LDSPOSLB      | integer                        | Label number for LDSPPOS (above)                               | DVLPOS        |
| LIBRARY       | char (8)                       | LIBRARY NAME (ATL LIBRARY)                                     | DVLLIBR       |
| LOCATION      | char (8)                       | Current location of the volume                                 | DVLCD         |
| LOCSEQ        | integer                        | Vault sequence number                                          | DVLVTSQ       |
| MEDIA         | char (8)                       | Volume's media type                                            | DVLMEDIA      |
| MOVEDATE      | date                           | Last move date                                                 | DVLMVDT       |
| NEXTVOL       | char (6)                       | Next volser for multi-volume chains                            | DVLNEXT       |
| PHYSVLSR      | char(6)                        | VTS physical volser                                            | DVLPHYVL      |

| EXTERNAL NAME | VALID VALUES | DESCRIPTION                                              | INTERNAL NAME |
|---------------|--------------|----------------------------------------------------------|---------------|
| PREVOL        | char (6)     | Previous volser for multi-volume chains                  | DVLPREV       |
| RECVLNUM      | integer      | Vault number (in pattern) from which the volume recalled | DVLVLT1       |
| RETVLTDT      | date         | Return to vault date                                     | DVLVRTRN      |
| SCRDT         | date         | Last volume scratch date                                 | DVLSCRDT      |
| SLNAME        | char (6)     | Volume's SL-NAME                                         | DVLSLNAME     |
| SLOTNUM       | integer      | Vault slot number                                        | DVLVSLOT      |
| SMSSG         | char (8)     | DFSMS Storage Group                                      | DVLMSSSG      |
| UNITGNAM      | char (8)     | Generic unit name                                        | DVLUGNAM      |
| USERDATA      | char (20)    | User data                                                | DVLUSER2      |
| VAULT         | char (8)     | First vault name in vault vaulting pattern information   | DVLVLTNM      |
| VAULT2        | char (8)     | Second vault name in vault vaulting pattern information  | —             |
| VAULT3        | char (8)     | Third vault name in vault vaulting pattern information   | —             |
| VCHANGED      | date         | Last change date                                         | DVLMDT        |
| VCHANGET      | time         | Last change time                                         | DVLMTM        |
| VCHANGEU      | char (8)     | Last user ID that changed the entry                      | DVLUSER       |
| VENDOR        | char (8)     | Name of vendor who manufactured the volume               | DVLVNDOR      |
| VFREE         | integer      | Available kilobytes on the volume                        | DVLFREE       |
| VLT2EXPD      | date/integer | Second vault expiration in the vaulting pattern          | —             |
| VLT3EXPD      | date/integer | Third vault expiration in the vaulting pattern           | —             |

| EXTERNAL NAME | VALID VALUES                                                       | DESCRIPTION                                                                                                                                                                                                                               | INTERNAL NAME |
|---------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| VLTDSDNUM     | integer                                                            | Vaulting dataset number                                                                                                                                                                                                                   | DVLVLTDSD     |
| VLTDSDT       | date                                                               | Entry date to the vault                                                                                                                                                                                                                   | DVLVENDT      |
| VLTDSDNM      | integer                                                            | Number of vault entries for the volume                                                                                                                                                                                                    | DVLVLTT       |
| VLTEXPD       | date/integer                                                       | Vault expiration date, number of cycles or number of days in the first vaulting pattern                                                                                                                                                   | DVLVXPD1      |
| VLTEXTYP      | VCYC<br>VDATE<br>VLACC<br>VCAT<br>VPERM<br>VEXP<br>VOLEXP<br>VDAYS | Vault expiration type:<br>Number of cycles<br>Actual date (in yyyyymmdd format)<br>Number of days since last access<br>MVS Catalog Control<br>Permanent<br>Until dataset expiration<br>Until volume expiration<br>Number of days in vault | DVLVXPT1      |
| VLTPREFL      | integer                                                            | Vaulting dataset name prefix length                                                                                                                                                                                                       | DVLPRFLN      |
| VLTVEXP       | integer                                                            | Vaulting pattern sequence number of the volume that holds the expiration type "VOL EXPIRE".                                                                                                                                               | DVLVEXP#      |
| VOLEDMID      | char (4)                                                           | EDM-ID for EDM controlled volumes:<br>HSM - DFSMSHsm<br>ADSM - ADSM<br>HPDM - ExHPDM                                                                                                                                                      | DVLEDMID      |
| VOLEXCP       | integer                                                            | EXCP count since last scratched                                                                                                                                                                                                           | DVLEXCP#      |
| VOLEXPDT      | date                                                               | Expiration date                                                                                                                                                                                                                           | DVLEXPDT      |
| VOLEXPTY      | DATE, PERM, UNKNOWN                                                | Expiration date type                                                                                                                                                                                                                      | DVLEXPT       |

| EXTERNAL NAME         | VALID VALUES                                                                      | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                          | INTERNAL NAME |
|-----------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| VOLFLAGS <sup>a</sup> | RETURNVL<br>DYNDEF<br>MANUPDAT<br>VLRSTRT<br>EXTDEL<br>MANVLT<br>SNGLVOL<br>INATL | Additional volume status flags:<br>Volume returned from vault<br>Volume dynamically defined<br>Volume manually updated (Online/Utility CTTMUP)<br>Volume processed under MVS RESTART<br>Volume is deleted when expired<br>Volume manually moved to vault<br>Single volume (out of multi-volume group) in VAULT/RECALL<br>Volume resides in an automated tape library | DVLFLG1       |
| VOLFLAG2 <sup>a</sup> | VLTRYBOX                                                                          | Additional status flag:<br>Volume can be vaulted by boxes                                                                                                                                                                                                                                                                                                            | DVLFLG2       |
| VOLIND <sup>a</sup>   | PVLTL<br>PENDVLT<br>RECALL<br>HOLD<br>NOSTACK<br>INUSE                            | Additional volume status indications:<br>Potential vault<br>Pending vault<br>Recalled back from a vault<br>Hold before return to vault<br>Stacked datasets not accepted<br>Volume is in-use                                                                                                                                                                          | DVLSTA2       |
| VOLODESC              | char (20)                                                                         | Volume's description                                                                                                                                                                                                                                                                                                                                                 | DVLDESC       |
| VOLOWNER              | char (8)                                                                          | Volume's owner                                                                                                                                                                                                                                                                                                                                                       | DVLOWNR       |
| VOLSEQ                | integer                                                                           | Volume sequence number                                                                                                                                                                                                                                                                                                                                               | DVLVSEQ       |
| VOLSER                | char (6)                                                                          | Volume serial number                                                                                                                                                                                                                                                                                                                                                 | DVLVOLSR      |



| EXTERNAL NAME        | VALID VALUES                                                                 | DESCRIPTION                                                                                                                                                            | INTERNAL NAME |
|----------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| VOLSTAT <sup>b</sup> | ACTIVE<br>SCRATCH<br>PENDSCR<br>OUT<br>VAULTED<br>EXTERNAL<br>EDM<br>DELETED | Status of volume:<br>Active<br>Scratch<br>Pending scratch<br>Out of library (but not vaulted)<br>Vaulted<br>External volume<br>EDM controlled volume<br>Deleted volume | DVLSTAT       |
| VOLTYPE              | PHYSICAL<br>LOGICAL                                                          | Volume types:<br>Physical<br>Logical                                                                                                                                   | DVLTYPE       |
| VOLUSECT             | integer                                                                      | Volume usage count from last scratch                                                                                                                                   | DVLUSED#      |
| VOLUSETC             | integer                                                                      | Volume usage count from date of entry to the library                                                                                                                   | DVLUSET#      |
| VRFORMAT             | Tape recording format of the data on the volume                              |                                                                                                                                                                        | DVLRFMT       |
|                      | BPI200                                                                       | 200 bits per inch                                                                                                                                                      |               |
|                      | BPI556                                                                       | 556 bits per inch                                                                                                                                                      |               |
|                      | BPI800                                                                       | 800 bits per inch                                                                                                                                                      |               |
|                      | BPI1600                                                                      | 1600 bits per inch                                                                                                                                                     |               |
|                      | BPI6250                                                                      | 1625 bits per inch                                                                                                                                                     |               |
|                      | TRACK18                                                                      | 18 tracks                                                                                                                                                              |               |
|                      | TRACK36                                                                      | 36 tracks                                                                                                                                                              |               |
|                      | TRACK128                                                                     | 128 tracks                                                                                                                                                             |               |
|                      | TRACK256                                                                     | 256 tracks                                                                                                                                                             |               |
|                      | TRACK384                                                                     | 384 tracks                                                                                                                                                             |               |

| EXTERNAL NAME | VALID VALUES   | DESCRIPTION                                              | INTERNAL NAME |
|---------------|----------------|----------------------------------------------------------|---------------|
|               | EFMT1          | Enterprise Recording Format 1                            |               |
| VSTKGRP       | char (8)       | Volume Stacking Group                                    | DVLSTKG       |
| VRTTCH        | COMP<br>NOCOMP | Indicates whether data is compressed (for example, IDRC) | DVLTRTCH      |
| VUSED         | integer        | Kilobytes used on the volume                             | DVLUSED       |

<sup>a</sup> This field can be used normally in INCLUDE/EXCLUDE statements of a report. It cannot, however, be used in a report's FIELDS and SORTBY statements; use fields DSSTAT and DSTATX instead. For more information, see the CTRPT utility in the *INCONTROL for z/OS Utilities Guide*.

<sup>b</sup> This field has a special meaning when used in the FIELDS and SORTBY statements of a report. For more information, see the CTRPT utility in the *INCONTROL for z/OS Utilities Guide*.

## Stacking record tables

The following table describes stacking records:

**Table 304 Keywords Used with Stacking Type Records**

| EXTERNAL NAME | VALID VALUES             | DESCRIPTION                                      | INTERNAL NAME |
|---------------|--------------------------|--------------------------------------------------|---------------|
| AVGSIZE       | integer                  | Average dataset size in kilobytes (compressed)   | STKAVCSZ      |
| AVGSIZEU      | integer                  | Average dataset size in kilobytes (uncompressed) | STKAVUSZ      |
| DATEUPD       | date                     | Last update date of the stacking record          | STKSTAMP      |
| RFORMAT       | Dataset recording format |                                                  | STKRFMT       |
|               | BPI200                   | 200 bits per inch                                |               |
|               | BPI556                   | 556 bits per inch                                |               |
|               | BPI800                   | 800 bits per inch                                |               |
|               | BPI1600                  | 1600 bits per inch                               |               |
|               | BPI6250                  | 1625 bits per inch                               |               |
|               | TRACK18                  | 18 tracks                                        |               |

| EXTERNAL NAME | VALID VALUES | DESCRIPTION                                                                                                                                                                                                                    | INTERNAL NAME |
|---------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
|               | TRACK36      | 36 tracks                                                                                                                                                                                                                      |               |
|               | TRACK128     | 128 tracks                                                                                                                                                                                                                     |               |
|               | TRACK256     | 256 tracks                                                                                                                                                                                                                     |               |
|               | TRACK384     | 384 tracks                                                                                                                                                                                                                     |               |
|               | EFMT1        | Enterprise Recording Format 1                                                                                                                                                                                                  |               |
| DSNAME        | char (44)    | Dataset name                                                                                                                                                                                                                   | STKDSN        |
| JOBNAME       | char (8)     | Job name                                                                                                                                                                                                                       | STKJBN        |
| LIFEOBS       | integer      | Total number of observations of the dataset (including observations not used to calculate dataset statistics)<br><br>This field is relevant only for datasets with nonspecific retention (for example, CATALOG or LAST ACCESS) | STKLSOBS      |
| LIFESPAN      | integer      | Average life span of the dataset in days<br><br>This field is relevant only for datasets with non-specific retention (for example, CATALOG or LAST ACCESS)                                                                     | STKLSPAN      |
| MAXSIZE       | integer      | Maximum dataset size in kilobytes (compressed)                                                                                                                                                                                 | STKMAXCS      |
| MINSIZE       | integer      | Minimum dataset size in kilobytes (compressed)                                                                                                                                                                                 | STKMINCS      |
| OBSERVE       | integer      | Number of observations of the dataset that were used to determine dataset statistics                                                                                                                                           | STKOBS        |
| PREDICTD      | integer      | Predicted dataset size in kilobytes (compressed)                                                                                                                                                                               | STKPREDC      |
| PREDICTU      | integer      | Predicted dataset size in kilobytes (uncompressed)                                                                                                                                                                             | STKPREDU      |

| EXTERNAL NAME | VALID VALUES | DESCRIPTION                                                            | INTERNAL NAME |
|---------------|--------------|------------------------------------------------------------------------|---------------|
| STATUS        | STK<br>NOSTK | Indication whether the dataset can be stacked                          | STKFLAG1      |
| STDDEV        | integer      | Standard deviation (in kilobytes) of dataset size for all observations | STKSTDEV      |
| TOTSIQ        | integer      | Square of accumulated length of all dataset observations in kilobytes  | STKTOTSQ      |
| TIMEUPD       | time         | Last update time of the stacking record                                | STKSTAMP+4    |
| UNIT          | char (8)     | Generic unit name                                                      | STKUNAM       |

## Trace record tables

The following table describes trace type records, and the table that follows it describes trace data records:

**Table 305      Keywords Used With Trace Type Records**

| EXTERNAL NAME | VALID VALUES | DESCRIPTION                                                             | INTERNAL NAME |
|---------------|--------------|-------------------------------------------------------------------------|---------------|
| CPUID         | char (4)     | CPU-ID                                                                  | ARCCPUID      |
| DATE          | date         | Date                                                                    | ARCDATE       |
| DSVOLSER      | char(6)      | Volser of the data set (or the first volser of a multi-volume data set) | DDSVOLSR      |
| DSLABEL       | integer      | Label number (data set sequence number on the tape)                     | DDSLBLNM      |

| EXTERNAL NAME | VALID VALUES                                                                                                                                                                                                                                                                                                                                                                                                                                                  | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                      | INTERNAL NAME |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| ENV           | DLD5<br>EDM<br>MUP<br>ONL<br>ONLC<br>RTM<br>STK<br>SVCT<br>UTL<br>VTM<br>\$RCV                                                                                                                                                                                                                                                                                                                                                                                | CTTDLD utility<br>External Data Manager<br>Manual update utility (CTTMUP)<br>Online facility<br>External Volume Check-In (TC Screen)<br>Retention management utility (CTTRTM).<br>Dynamic Stacking Facility<br>Real-time environment<br>Volume expiration utility<br>Vault management utility (CTTVTM)<br>Utility CTTRCV Recover Media Database using Trace file | ARCIDENT      |
| FUNCTION      | ADD, DELETE, CHANGE                                                                                                                                                                                                                                                                                                                                                                                                                                           | Activity type                                                                                                                                                                                                                                                                                                                                                    | ARCTYPE       |
|               | <p>Note: When they appear in output, ADD, DELETE, and CHANGE are represented by the following Trace file records:</p> <ul style="list-style-type: none"> <li>▪ The ADD value is represented by REC–ADD.</li> <li>▪ The DELETE value is represented by REC–DEL.</li> <li>▪ The CHANGE value is represented by the following two records: REC–OLD (the state of the record before the change) and REC–NEW (the state of the record after the change)</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                  |               |
| JOBID         | char (8)                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Job ID (format JOBxxxxx)                                                                                                                                                                                                                                                                                                                                         | ARCJOBID      |
| TIME          | time                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Time                                                                                                                                                                                                                                                                                                                                                             | ARCTIME       |
| JOBNAME       | char (8)                                                                                                                                                                                                                                                                                                                                                                                                                                                      | User ID/Job name                                                                                                                                                                                                                                                                                                                                                 | ARCUSRID      |

**Table 306      Keywords Used With Trace Data**

| EXTERNAL NAME | VALID VALUES | DESCRIPTION          | INTERNAL NAME      |
|---------------|--------------|----------------------|--------------------|
| RECTYPE       | V, D         | MDB Record Type      | DVLRTYPE, DDSRTYPE |
| VOLSER        | char (6)     | Volume serial number | DVLVOLSR           |
| DSNAME        | char (44)    | Dataset name         | DDSDSN             |
| RBA           | hex (8)      | Record's RBA         | DVLRBA, DDSRBA     |

## SMF record table

The following table describes SMF records processed by the CTTSCA utility:

**Table 307      Keywords for Selecting SMF Records to be Processed by Utility CTTSCA**

| EXTERNAL NAME | VALID VALUES | DESCRIPTION           | INTERNAL NAME |
|---------------|--------------|-----------------------|---------------|
| CPUID         | char (4)     | CPU ID                | SCACPUID      |
| JOBNAME       | char (8)     | Job name              | SCAJBNAM      |
| DSNAME        | char (44)    | Dataset name          | SCADSNAM      |
| DATE          | date         | Dataset creation date | SCADATE       |
| TIME          | time         | Dataset creation time | SCATIME       |

## E IOA Online Options Cross-reference

Cross-reference between IOA Online Options and screen titles, modules, CSETs, and format, PFKey, command, and help members.

Screen members have a language identifier as the last character in their names (E=English, G=German, and so on).

**Table 308 IOA Online Options**

| Option         | Screen Title                              | Module/<br>CSET | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|----------------|-------------------------------------------|-----------------|-------------------------|-----------------|-------------------|-------------|
| 1              | IOA Primary<br>Option Menu                | IOATMNU         | \$\$MNU                 | TMNUPF3         | TMNUCMD3          | CTMHMNU*    |
| 4              | IOA<br>Conditions/<br>Resources           | IOATRES         | CTMSRES                 | TRESPF1         | TRESCMD1          | CTMHRES     |
| 5              | IOA Log file                              | IOATLOG         | \$\$LOG                 | TLOGPF1         | TLOGCMD1          | CTMHLOG     |
|                | Display<br>Options                        | IOATDID         |                         | TDIDPF1         | TDIDCMD1          | IOAHDID     |
|                | Display Filters                           | IOATDID         | \$\$SHOW                | TDIDPF1         | TDIDCMD1          | IOAHDID     |
| 6              | TSO – TSO<br>command                      | CTMTTSO         | CTMSTSO                 | TTSOPF1         | TTSOCMD1          | CTMHTSO     |
| 6 <sup>a</sup> | ISPF Utilities                            | IOAIUTI         |                         |                 |                   |             |
| 7              | IOA Manual<br>Conditions                  | CTMTNRS         | CTMSNRS                 | TNRSPF1         | TNRSCMD1          | CTMHNRS     |
| 8              | IOA Calendar<br>Facility (Entry<br>Panel) | IOATDTM         | \$\$DTM                 | TDTMPF1         | TDTCMD            | CTMHDTM     |
| 8.D            | List of<br>Calendars                      | IOATDTM         | \$\$DIRDTM              | TDTMPF3         | TDTCMD            | CTMHDT2     |
| 8.D            | List of Years                             | IOATDTM         | \$\$TBLDTM              | TDTMPF3         | TDTCMD2           | CTMHDT3     |
| 8.Y            | Calendar<br>Definition                    | CTMTYER         | CTMSYER                 | TDTMPF4         | TDTCMD1           | CTMHYER     |

| Option | Screen Title                                   | Module/<br>CSECT | Screen/Forma<br>t Member | PFKey<br>Member | Command<br>Member | Help Member |
|--------|------------------------------------------------|------------------|--------------------------|-----------------|-------------------|-------------|
| 8.RL   | List of RBC<br>Calendars                       | IOATDTM          | \$\$DIRRBC               | TDTMPF3         | TDTCMD            | CTMHDT4     |
|        | SCHEDULE<br>RBC                                | CTMTRBD          | CTMSRBDE                 | TRBDPF1         | TRBDCMD1          | CTMHRBD     |
| IV     | Variables<br>Facility -<br>Entry Panel         | IOATVMN          | \$\$VMN                  | TVARPF1         | TVARCMD1          | IOAHVMN     |
| IV     | Variables<br>Facility -<br>Active Pool<br>List | IOATDBS          | \$\$DBS                  | TVARPF2         | TVARCMD1          | IOAHDB1     |
| IV     | Variables<br>Facility –<br>Database List       | IOATDBS          | \$\$DBS                  | TVARPF2         | TVARCMD1          | IOAHDBS     |
| IV.S   | Variables<br>Facility –<br>Column List         | IOATCLM          | \$\$CLMN                 | TVARPF2         | TVARCMD1          | IOAHCLM     |
| IV.V   | Variable<br>Database<br>Display<br>Screen      | IOATRWS          | \$\$RWS                  | TVARPF3         | TVARCMD1          | IOHRWS      |
| IV.V.Z | Variable<br>Database<br>Zoom Screen            | IOASRWZ          | \$\$RWZ                  | TVARPF2         | TVARCMD1          | IOHRWZ      |

<sup>a</sup>A separate ISPF panel cross-reference appears in [Options in the IOA PANEL Library](#) (on page 822).



**Table 309 Control-M Online Options**

| Option            | Screen Title                            | Module/<br>CSECT | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|-------------------|-----------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| 2                 | Scheduling<br>Definition<br>Entry Panel | IOATSCH          | \$\$SCH                 | TSCHPF1         | TSCHCMD           | CTMHSC      |
| 2                 | Table List                              | IOATSCH          | \$\$DIRSCH              | TSCHPF3         | TSCHCMD           | CTMHSC2     |
| 2                 | Job List                                | IOATSCH          | \$\$TBLSCH              | TSCHPF3         | TSCHCMD2          | CTMHSC3     |
| 2.O               | Job Order<br>Messages                   | IOATWIN          | CTMSJOB                 | TWINPF1         | TWINCMD1          | CTMHJOB     |
| 2.G               | Graphic Job<br>Flow                     | CTMRFLW          | CTMSGRF                 | TGRFPF1         | TGRFCMD1          | CTMHGRF     |
| 2.P               | Job<br>Scheduling<br>Plan               | CTMTRPL          | \$\$RPL                 | TRPLPF1         | TRPLCMD1          | CTMHRPL     |
|                   | Display Plan<br>Window                  | IOATSCH          | \$\$PLAN                | TPLNPF1         | TPLNCMD1          |             |
| 2.J               | IOA Editor<br>Screen                    | IOATEDJ          | \$\$EDJ                 | TEDJPF1         | TEDJCMD1          | IOAHEDJ     |
| 2.%               | IOA Editor<br>Screen                    | IOATEDJ          | \$\$EDJ                 | TEDJPF1         | TEDJCMD1          | IOAHEDJ     |
| 2.T               | Statistic<br>Screen                     | CTMTVST          | CTMSVST                 | TVSTPF1         | TVSTCMD1          | CTMHVST     |
| 2                 | Job Definition<br>Screen                | CTMTZUM          | CTMSZUM                 | TZUMPF1         | TZUMCMD1          | CTMHZUM     |
| 2                 | Group<br>Definition<br>Screen           | CTMTGZM          | CTMSGZM                 | TGZMPF1         | TGZMCMD1          | CTMHGZM     |
| 3, 3.G,<br>3.HIST | Active<br>Environment                   | CTMTACT          | \$\$ACT                 | TACTPF          | TACTCMD           | CTMHACT     |
| 3.Z               | Job Zoom<br>Screen                      | CTMTSZM          | CTMSSZM                 | TSZMPF1         | TSZMCMD1          | CTMHSZM     |
| 3.?               | Job's WHY<br>Screen                     | CTMTWHY          | CTMSWHY                 | TWHYPF1         | TWHYCMD1          | CTMHWHY     |

| Option | Screen Title                     | Module/<br>CSECT | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|--------|----------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| 3.S    | Job's Statistics                 | CTMTVST          | CTMSVST                 | TVSTPF1         | TVSTCMD1          | CTMHVST     |
| 3.V    | Job's View<br>SYSOUT             | CTMTSYV          | CTMSAJH                 | TAJHPF1         | TAJHCMD1          | CTMHAJH     |
| 3.V.S  | Job's SYSOUT<br>Viewing          | IOATOLV          | CTMSSYV                 | TSYVPF1         | TSYVCMD1          | CTMHSYV     |
| 3.VIEW | Job's GROUP<br>DISPLAY           | CTMTVEW          | CTMSVEW                 | TVEWPF1         | TVEWCMD1          | CTMHVEW     |
| C      | CMEM Entry<br>Panel              | IOATOMP          | \$\$RCM                 | TRCMPF1         | TRCMCMD           | CTMHRM      |
| C      | Tables/Rules<br>of Library       | IOATOMP          | \$\$DIRRCM              | TRCMPF3         | TRCMCMD           | CTMHCM2     |
| C      | Rules of<br>Tables in<br>Library | IOATOMP          | \$\$TBLRCM              | TRCMPF3         | TRCMCMD2          | CTMHCM3     |
| C      | Rule Definition<br>Screen        | CTOTRUL          | CTOSRUL                 | TRULPF1         | TRULCMD1          | CTMHRUL     |

**Table 310 Control-D Online Options**

| Option | Screen Title                                           | Module/<br>CSECT | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|--------|--------------------------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| A      | Mission Status<br>Screen                               | CTDTAMS          | CTDSAMS                 | TAMSPF1         | TAMSCMD1          | CTDHAMS     |
| A.Z    | Zoom<br>Decollating<br>Mission<br>Definition<br>Screen | CTDTDEC          | CTDSDEC                 | TDECPF1         | TDECCMD1          | CTDHDEC     |
| A.Z    | Zoom Printing<br>Mission<br>Definition<br>Screen       | CTDTAPR          | CTDSAPR                 | TAPRPF1         | TAPRCMD1          | CTDHAPR     |

| Option | Screen Title                                                  | Module/<br>CSECT | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|--------|---------------------------------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| A.Z    | Zoom Restore<br>Mission<br>Definition<br>Screen               | CTDTARS          | CTDSARS                 | TARSPF1         | TARSCMD1          | CTDHARS     |
| A.Z    | Zoom Backup<br>Mission<br>Definition<br>Screen                | CTDTABK          | CTDSABK                 | TABKPF1         | TABKCMD1          | CTDHABK     |
| A.L    | LOG<br>messages                                               | IOATLOG          | \$\$LOG                 | TLOGPF1         | TLOGCMD1          | CTMHLOG     |
| A.P    | Print Plan<br>Screen                                          | CTDTPMM          | CTDSPMM                 | TPMMPF1         | TPMMCMD1          | CTDHPMM     |
| A.?    | WHY Screen                                                    | CTDTDWY          | CTDSDWY                 | TDWYPF1         | TDWYCMD1          | CTDHDWY     |
| R      | Report<br>Decollating<br>Mission<br>Definition<br>Entry Panel | IOATREP          | \$\$REP                 | TREPPF1         | TREPCMD           | CTDHREP     |
| R      | Job List                                                      | IOATREP          | \$\$DIRREP              | TREPPF3         | TREPCMD           | CTDHRE2     |
| R      | Categories of<br>Library                                      | IOATREP          | \$\$TBLREP              | TREPPF3         | TREPCMD2          | CTDHRE3     |
| R      | Report<br>Decollation<br>Mission<br>Definition<br>Screen      | CTDTCAT          | CTDSCAT                 | TCATPF1         | TCATCMD1          | CTDHCAT     |
| R.O    | Order<br>Decollation<br>Mission<br>Screen                     | IOATWIN          | CTDSCAM                 | TWINPF1         | TWINCMD1          | CTDHCAM     |
| M      | Mission<br>Definition<br>Entry Panel                          | IOATMIS          | \$\$MIS                 | TMISPF1         | TMISCMD           | CTDHMIS     |
| M      | Mission List                                                  | IOATMIS          | \$\$DIRMIS              | TMISPF3         | TMISCMD           | CTDHMI2     |

| Option | Screen Title                               | Module/<br>CSECT | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|--------|--------------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| M      | Category List                              | IOATMIS          | \$\$TBLMIS              | TMISPF3         | TMISCMD2          | CTDHMI3     |
| M      | Print Mission<br>Definition<br>Screen      | CTDTPRT          | CTDSPRT                 | TPRTPF1         | TPRTCMD1          | CTDHPRT     |
| M      | Backup<br>Mission<br>Definition<br>Screen  | CTDTBKP          | CTDSBKP                 | TBKPPF1         | TBKPCMD1          | CTDHBKP     |
| M      | Restore<br>Mission<br>Definition<br>Screen | CTDTRST          | CTDSRST                 | TRSTPF1         | TRSTCMD1          | CTDHRST     |
| M.O    | Mission Order                              | IOATWIN          | CTDSMIM                 | TWINPF1         | TWINCMD1          | CTDHMIM     |
| F      | PC Packet<br>Status                        | CTDTATF          | CTDSATF                 | TATFPF1         | TATFCMD1          | CTDHATF     |
| F.Z    | Packet Zoom<br>Screen                      | CTDTZTF          | CTDSZTF                 | TDECPF1         | TDECCMD1          | CTDHZTF     |
| F.I    | Packet Index<br>Screen                     | CTDTITF          | CTDSITF                 | TITFPF1         | TITFCMD1          | CTDHITF     |
| U      | User Reports<br>Entry Panel                | CTDTUSR          | \$\$USR                 | TUSRPF1         | TUSRCMD1          | CTDHUSR     |
| U      | User Report<br>Lists                       | CTDTUSR          | \$\$FRM                 | TUSRPF2         | TUSRCMD2          | CTDHUS2     |
| U.N    | General<br>Notepad<br>Screen               | CTDTNTP          | CTDSNTP                 |                 |                   |             |
| U.P    | Print Report                               | CTDTUSR          | \$\$PRT                 |                 |                   | CTDHUSI     |
| U.V    | Report<br>Viewing                          | IOATOLV          | CTDSOLV                 | TOLVPF1         | TOLVCMD1          | CTDHOLV     |
| U.V    | Tag Notepad<br>Screen                      | CTDTNTP          | CTDSNTP                 |                 |                   |             |

| Option  | Screen Title                         | Module/<br>CSECT | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|---------|--------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| U.E     | Report Editing<br>Screen             | CTDTEXT          | CTDSEXT                 | TOLVPF2         | TOLVCMD1          | CTDHEXT     |
| U.E.1   | Edit Report<br>Lines and<br>Columns  | CTDTLNF          | CTDSLNF                 | TOLVPF3         | TOLVCMD1          | CTDHINF     |
| U.E.1.C | Edit Report<br>Columns               | CTDTCLF          | CTDSCLF                 | TOLVPF5         | TOLVCMD1          | CTDHCLF     |
| U.E.2   | Include Lines<br>Based on<br>Strings | CTDTINC          | CTDSINC                 | TOLVPF4         | TOLVCMD1          | CTDHINC     |
| U.E.3   | Exclude Lines<br>Based on<br>Strings | CTDTEXC          | CTDSEXC                 | TOLVPF4         | TOLVCMD1          | CTDHINC     |
| U.E.4   | Color Lines<br>Based on<br>Strings   | CTDTCOL          | CTDSCOL                 | TOLVPF4         | TOLVCMD1          | CTDHCLR     |
| T       | Recipient Tree<br>Entry Panel        | CTDTUTR          | CTDSUTE                 | TUTRPF1         | TUTRCMD1          | CTDHUTR     |
| T       | Control-D<br>Recipient Tree          | CTDTUTR          | CTDSUTS                 | TUTRPF2         | TUTRCMD1          | CTDHUT2     |
| T       | Control-D<br>CHECK TREE<br>Messages  | CTMTJOB          | CTDSTRM                 | TTRMPF1         | TTRMCMD1          | CTDHTRM     |
| T.S     | Control-D<br>Recipient<br>Definition | CTDTRCP          | CTDSRCP                 | TRCPPF1         | TRCPCMD1          | CTDHRCP     |

**Table 311 Control-V Online Options**

| Option | Screen Title                                                  | Module/<br>CSECT | Screen/Format<br>Member | PfKey<br>Member | Command<br>Member | Help Member |
|--------|---------------------------------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| A      | Mission Status                                                | CTDTAMS          | CTDSAMS                 | TAMSPF1         | TAMSCMD1          | CTVHAMS     |
| A.Z    | Zoom<br>Decollating<br>Mission<br>Definition                  | CTDTDEC          | CTDSDEC                 | TDECPF1         | TDECCMD1          | CTVHDEC     |
| A.Z    | Zoom Printing<br>Mission<br>Definition                        | CTDTAPR          | CTDSAPR                 | TAPRPF1         | TAPRCMD1          | CTVHAPR     |
| A.Z    | Zoom Restore<br>Mission<br>Definition                         | CTDTARS          | CTDSARS                 | TARSPF1         | TARSCMD1          | CTVHARS     |
| A.Z    | Zoom Backup<br>Mission<br>Definition                          | CTDTABK          | CTDSABK                 | TABKPF1         | TABKCMD1          | CTVHABK     |
| A.Z    | Zoom<br>Migration<br>Mission<br>Definition                    | CTDTABK          | CTDSABK                 | TABKPF1         | TABKCMD1          | CTVHAMG     |
| A.L    | LOG Messages                                                  | IOATLOG          | \$\$LOG                 | TLOGPF1         | TLOGCMD1          | CTMHLOG     |
| A.P    | Print Plan<br>Screen                                          | CTDTPMM          | CTDSPMM                 | TPMMPF1         | TPMMCMD1          | CTVHPMM     |
| A.?    | WHY Screen                                                    | CTDTDWY          | CTDSDWY                 | TDWYPF1         | TDWYCMD1          | CTVHDWY     |
| R      | Report<br>Decollating<br>Mission<br>Definition<br>Entry Panel | IOATREP          | \$\$REP                 | TREPPF1         | TREPCMD           | CTDVREP     |
| R      | Job List                                                      | IOATREP          | \$\$DIRREP              | TREPPF3         | TREPCMD           | CTVHRE2     |
| R      | Categories of<br>Library                                      | IOATREP          | \$\$TBLREP              | TREPPF3         | TREPCMD2          | CTVHRE3     |

| Option | Screen Title                                             | Module/<br>CSECT | Screen/Format<br>Member | PfKey<br>Member    | Command<br>Member | Help Member |
|--------|----------------------------------------------------------|------------------|-------------------------|--------------------|-------------------|-------------|
| R      | Report<br>Decollation<br>Mission<br>Definition<br>Screen | CTDTCAT          | CTDSCAT                 | TCATPF1            | TCATCMD1          | CTVHCAT     |
| R.O    | Order<br>Decollation<br>Mission<br>Screen                | IOATWIN          | CTDSCAM                 | TWINPF1            | TWINCMD1          | CTVHCAM     |
| M      | Mission<br>Definition<br>Entry Panel                     | IOATMIS          | \$\$MIS                 | TMISPF1            | TMISCMD           | CTVHMIS     |
| M      | Mission List                                             | IOATMIS          | \$\$DIRMIS              | TMISPF3            | TMISCMD           | CTVHMI2     |
| M      | Category List                                            | IOATMIS          | \$\$TBLMIS              | TMISPF3            | TMISCMD2          | CTVHMI3     |
| M      | Print Mission<br>Definition<br>Screen                    | CTDTPRT          | CTDSPRT                 | TPRTPF1            | TPRTCMD1          | CTVHPRT     |
| M      | Backup<br>mission<br>Definition<br>Screen                | CTDTBKP          | CTDSBKP                 | TBKPPF1            | TBKPCMD1          | CTVHBKP     |
| M      | Migration<br>mission<br>Definition<br>Screen             | CTDTMIG          | CTDSMIG                 | TMIGPF1<br>TMIGPF2 | TMIGCMD1          | CTVHMIG     |
| M      | Restore<br>Mission<br>Definition<br>Screen               | CTDTRST          | CTDSRST                 | TRSTPF1            | TRSTCMD1          | CTVHRST     |
| M.O    | Mission Order                                            | IOATWIN          | CTDSMIM                 | TWINPF1            | TWINCMD1          | CTVHMIM     |
| F      | PC Packet<br>Status                                      | CTDTATF          | CTDSATF                 | TATFPF1            | TATFCMD1          | CTVHATF     |
| F.Z    | Packet Zoom<br>Screen                                    | CTDTZTF          | CTDSZTF                 | TDECPF1            | TDECCMD1          | CTVHZTF     |

| Option  | Screen Title                         | Module/<br>CSECT | Screen/Format<br>Member | PfKey<br>Member | Command<br>Member | Help Member |
|---------|--------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| F.I     | Packet Index<br>Screen               | CTDTITF          | CTDSITF                 | TITFPF1         | TITFCMD1          | CTVHITF     |
| U       | User Reports<br>Entry Panel          | CTDTUSR          | \$\$USR                 | TUSRPF1         | TUSRCMD1          | CTVHUSR     |
| U       | User Report<br>Lists                 | CTDTUSR          | \$\$FRM                 | TUSRPF2         | TUSRCMD2          | CTVHUS2     |
| U.N     | General<br>Notepad<br>Screen         | CTDTNTP          | CTDSNTP                 |                 |                   |             |
| U.P     | Print Report                         | CTDTUSR          | \$\$FRM                 |                 |                   | CTVHUSI     |
| U.V     | Report<br>Viewing                    | IOATOLV          | CTDSOLV                 | TOLVPF1         | TOLVCMD1          | CTVHOLV     |
| U.V     | Tag Notepad<br>Screen                | CTDTNTP          | CTDSNTP                 |                 |                   |             |
| U.E     | Report Editing<br>Screen             | CTDTEXT          | CTDSEXT                 | TOLVPF2         | TOLVCMD1          | CTVHEXT     |
| U.E.1   | Edit Report<br>Lines and<br>Columns  | CTDTLNF          | CTDSLNF                 | TOLVPF3         | TOLVCMD1          | CTVHLNF     |
| U.E.1.C | Edit Report<br>Columns               | CTDTCLF          | CTDSCLF                 | TOLVPF5         | TOLVCMD1          | CTVHCLF     |
| U.E.2   | Include Lines<br>Based on<br>Strings | CTDTINC          | CTDSINC                 | TOLVPF4         | TOLVCMD1          | CTVHINC     |
| U.E.3   | Exclude Lines<br>Based on<br>Strings | CTDTEXC          | CTDSEXC                 | TOLVPF4         | TOLVCMD1          | CTVHINC     |
| U.E.4   | Color Lines<br>Based on<br>Strings   | CTDTCOL          | CTDSCOL                 | TOLVPF4         | TOLVCMD1          | CTVHCLR     |
| U.Q     | Quick Access<br>Panel                | CTVTQAC          | \$\$QAC                 | TQACPF1         | TQACCMD1          | CTVHQAC     |



| Option | Screen Title                           | Module/<br>CSECT | Screen/Format<br>Member | PfKey<br>Member | Command<br>Member | Help Member |
|--------|----------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| U.Q.X  | Values of<br>Index                     | CTVTVOI          | \$\$VOI                 | TVOIPF1         | TVOICMD1          | CTVHVOI     |
| U.S.X  | Values of<br>Index                     | CTVTVOI          | \$\$VOI                 | TVOIPF1         | TVOICMD1          | CTVHVOI     |
| T      | Recipient Tree<br>Entry Panel          | CTDTUTR          | CTDSUTR                 | TUTRPF1         | TUTRCMD1          | CTVHUTR     |
| T      | Control-D/V<br>Recipient Tree          | CTDTUTR          | CTDSUTR                 | TUTRPF2         | TUTRCMD1          | CTVHUT2     |
| T      | Control-D/V<br>CHECK TREE<br>Messages  | CTMTJOB          | CTDSTRM                 | TTRMPF1         | TTRMCMD1          | CTVHTRM     |
| T.S    | Control-D/V<br>Recipient<br>Definition | CTDTRCP          | CTDSRCP                 | TRCPPF1         | TRCPCMD1          | CTVHRCP     |

**Table 312 Control-O Online Options**

| Option | Screen Title                   | Module/<br>CSECT | Screen/Format<br>Member | PfKey<br>Member | Command<br>Member | Help Member |
|--------|--------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| OR     | Rule Definition<br>Entry Panel | IOATOMP          | \$\$OMP                 | TOMPPF3         | TOMPCMD           | CTOHOMP     |
| OR     | Tables of<br>Library           | IOATOMP          | \$\$DIROMP              | TOMPPF3         | TOMPCMD           | CTOHOM2     |
| OR     | Order/ Force<br>Messages       | IOATWIN          | CTOSOMM                 | TWINPF1         | TWINCMD1          | CTOHOMM     |
| OR     | Rules of Table                 | IOATOMP          | \$\$TBLOMP              | TOMPPF3         | TOMPCMD2          | CTOHOM3     |
| OR     | Rule Definition<br>Screen      | CTOTRUL          | CTOSRUL                 | TRULPF1         | TRULCMD1          | CTOHRUL     |
| OM     | MSG Statistics                 | CTOTMSC          | CTOSMSC                 | TMSCPF1         | TMSCCMD1          | CTOHMSC     |
| OS     | Rule Status                    | CTOTARF          | CTOSARF                 | TARFPF1         | TARFCMD1          | CTOHARF     |
| OS     | Error<br>Messages              | CTOTARM          | CTOSARM                 | TARMPF1         | TARMCMD1          | CTOHARM     |

| Option | Screen Title          | Module/<br>CSECT | Screen/Format<br>Member       | PFKey<br>Member | Command<br>Member | Help Member |
|--------|-----------------------|------------------|-------------------------------|-----------------|-------------------|-------------|
| OS     | Why (?)               | CTOTOWY          | CTOSOWY                       | TOWYPF1         | TOWYCMD1          | CTOHOWY     |
| OL     | Automation<br>Log     | CTOTALO          | \$\$ALO                       | TALOPF1         | TALOCMD1          | IOAHALO     |
| OA     | Automation<br>Options | CTOTAOP          | \$\$AOP<br>##AOP <sup>a</sup> | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
|        | COMMAND               | CTOTMCS          | \$\$AOPCMD                    | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
|        | CONSOLE               | CTOTCNS          | \$\$AOPCNS                    | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
|        | ENQINFO               | CTOTGES          |                               | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
|        | GLOBALS               | CTOTGLB          |                               | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
|        | SUBSYS                | CTOTSBS          |                               | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
|        | SERVERS               | CTOTSRV          |                               | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
| OA     | OPERATOR<br>Menu      | CTOTAMN          |                               | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
| OA     | SAMPLE Menu           | CTOTAMN          |                               | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
| OA     | SLIP Menu             | CTOTAMN          |                               | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
| OA     | Operator<br>Command   | CTOTMCS          |                               | TAOPPF1         | TAOPCMD1          | CTOHAOP     |
| OC     | Control-O/<br>COSMOS  | CTOTCMN          |                               | TAOPPF1         | TAOPPF1           | CTOHALO     |
| OC     | OBJECT                | CTOTCOS          |                               | TAOPPF1         | TAOPPF1           | CTOHCOS     |
| OC     | DATABASE              | CTOTDBS          |                               | TAOPPF1         | TAOPPF1           | CTOHCOS     |
| OK     | KOA Recorder          | OAKOAR           |                               | TKORPF1         | TCORCMD1          | IOAHKOR     |

<sup>a</sup>Data for the Format member.

**Table 313 Control-M/Analyzer Online Options**

| Option | Screen Title                                         | Module/<br>CSECT | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|--------|------------------------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| BB     | Balancing<br>Status                                  | CTBTABS          | CTBSABS                 | TABSPF1         | TABSCMD1          | CTBHABS     |
| BB.L   | LOG messages                                         | IOATLOG          | \$\$LOG                 | TLOGPF1         | TLOGCMD1          | CTMHLOG     |
| BB.?   | WHY screen<br>displayed for a<br>rule                | CTBTBWY          | CTBSBWY                 | TBWYPF1         | TBWYCMD<br>1      | CTBHBWY     |
| BM     | Mission<br>Definition                                | IOATBAL          | \$\$BAL                 | TBALPF1         | TBALCMD           | CTBHBAL     |
| BM     | Mission List                                         | IOATBAL          | \$\$DIRBAL              | TBALPF3         | TBALCMD           | CTBHBA2     |
| BM     | Category List                                        | IOATBAL          | \$\$TBLBAL              | TBALPF3         | TBALCMD2          | CTBHBA3     |
| BM.O   | Order/Force<br>messages                              | IOATWIN          | CTBSBAO                 | TWINPF1         | TWINCMD1          | CTBHBAO     |
| BM.S   | Balancing<br>Mission<br>Definition<br>Screen         | CTBTBMD          | CTBSBMD                 | TBMDPF1         | TBMDCMD1          | CTHBMD      |
| BV     | Database<br>Variables<br>Definition<br>Facility      | CTBTDAT          | CTBSCH                  | TDATPF1         | TDATCMD1          | CTBHDTAT    |
| BV     | Database<br>Facility –<br>Group List                 | CTBTDAT          | CTBSDAR                 | TDATPF3         | TDATCMD1          | CTBHDA2     |
| BV     | Database<br>Facility –<br>Variables List             | CTBTDAT          | CTBSDAR                 | TDATPF3         | TDATCMD1          | CTBHDA3     |
| BV.G   | Display<br>Variable by<br>Graph                      | IOATGRU          | \$\$BVG                 | TGRPPF1         | TGRPCMD1          | IOAHGRU     |
| BV.V   | Display And<br>Update<br>Variables In<br>Active File | CTBTDBV          | CTBSDBV                 | TDBVPF1         | TDBVCMD1          | CTBHDBV     |

| Option | Screen Title                                                       | Module/<br>CSECT | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|--------|--------------------------------------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| BV.S   | Control-M/<br>Analyzer<br>Variable<br>Definition                   | CTBTMOD          | CTBSMOD                 | TMODPF1         | TMODCMD<br>1      | CTBHMOD     |
| BR     | Rule Definition<br>– Entry Panel                                   | CTBTRLB          | CTBSRLB                 | TRLBPF1         | TRLBCMD1          | CTBHRLB     |
| BR     | Rule List                                                          | CTBTRLB          | CTBSDIR                 | TRLBPF3         | TRLBCMD1          | CTBHRL2     |
| BR.S   | Rule Definition<br>Screen                                          | CTBTRUM          | CTBSRUM                 | TRUMPF1         | TRUMCMD1          | CTBHRUM     |
| BR.S   | Rule Definition<br>Compiler<br>Messages<br>Screen                  | CTMTJOB          | CTBSJOB                 | TJOBPF1         | TJOBCMD1          | CTBHJOB     |
| BA     | Rule Activity<br>Entry Panel                                       | CTBTJBL          | CTBSJBL                 | TJBLPF1         | TJBLCMD1          | CTBHJBL     |
| BA     | Rule Activity                                                      | CTBTJBL          | CTBSJAC                 | TJBLPF2         | TJBLCMD1          | CTBHJB2     |
| BA     | Control-M/<br>Analyzer<br>List-Editing-Format<br>Error<br>Messages | CTMTJOB          | CTBSJER                 | TJERPF1         | TJERCMD1          | CTBHJER     |
| BA     | Control-M/<br>Analyzer<br>Report<br>Viewing                        | CTMTJOB          | CTBSJRP                 | TJRPPF1         | TJRPCMD1          | CTBHJRP     |
| BA.G   | Display<br>Variable by<br>Graph                                    | IOATGRU          | \$\$BJG                 | TGRPPF1         | TGRPCMD1          | IOAHGRU     |

**Table 314 Control-M/Tape Online Options**

| Option | Screen Title                       | Module/<br>CSECT | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|--------|------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| TR     | Rule Definition<br>Entry Panel     | IOATRLD          | \$\$RLD                 | TRLDPF1         | TRLDCMD           | CTTHRLD     |
| TR     | Rule Definition<br>List of Tables  | IOATRLD          | \$\$DIRRLD              | TRLDPF3         | TRLDCMD           | CTTHRL2     |
| TR     | Rule Definition<br>List of Rules   | IOATRLD          | \$\$TBLRLD              | TRLDPF3         | TRLDCMD2          | CTTHRL3     |
| TR     | Rule Definition<br>Screen          | CTTTRLM          | CTTSRLM                 | TRLMPF1         | TRLMCMD1          | CTTHRLM     |
| TP     | Pool Definition<br>Entry Panel     | IOATPLD          | \$\$PLD                 | TPLDPF1         | TPLDCMD           | CTTHPLD     |
| TP     | Pool Definition<br>List of Tables  | IOATPLD          | \$\$DIRPLD              | TPLDPF3         | TPLDCMD           | CTTHPL2     |
| TP     | Pool Definition<br>List of Pools   | IOATPLD          | \$\$TBLPLD              | TPLDPF3         | TPLDCMD2          | CTTHPL3     |
| TP     | Pool Definition<br>Screen          | CTTTPLM          | CTTSPLM                 | TPLMPF1         | TPLMCMD1          | CTTHPLM     |
| TV     | Vault<br>Definition<br>Entry Panel | IOATVLD          | \$\$VLD                 | TVLDPF1         | TVLDCMD           | CTTHVLD     |
| TV     | Vault<br>Definition<br>Table List  | IOATVLD          | \$\$DIRVLD              | TVLDPF3         | TVLDCMD           | CTTHVL2     |
| TV     | Vault<br>Definition<br>Vaults List | IOATVLD          | \$\$TBLVLD              | TVLDPF3         | TVLDCMD2          | CTTHVL3     |
| TV     | Vault<br>Definition<br>Screen      | CTTTVLM          | CTTSVLM                 | TVLMPF1         | TVLMCMD1          | CTTHVLM     |

| Option | Screen Title                                       | Module/<br>CSECT | Screen/Format<br>Member | PFKey<br>Member | Command<br>Member | Help Member |
|--------|----------------------------------------------------|------------------|-------------------------|-----------------|-------------------|-------------|
| TI     | Inquire/<br>Update MDB<br>Entry Panel              | CTTTINQ          | \$\$INQ                 | TINQPF1         | TINQCMD1          | CTTHINQ     |
| TI     | Inquire/<br>Update MDB<br>Variables List           | CTTTINQ          | \$\$INS                 | TINQPF3         | TINQCMD1          | CTTHINS     |
| TI     | Inquire/<br>Update MDB<br>Volume<br>Update Screen  | CTTTUPR          | \$\$UPV                 | TUPRPF1         | TUPRCMD1          | CTTHUPR     |
| TI     | Inquire/<br>Update MDB<br>Dataset<br>Update Screen | CTTTUPR          | \$\$UPD                 | TUPRPF1         | TUPRCMD1          | CTTHUPR     |
| TC     | Check In<br>External<br>Volume                     | CTTTKIN          | \$\$KIN                 | TKINPF1         | TKINCMD1          | CTTHKIN     |

## Options in the IOA PANEL Library

Screen members have a language identifier as the last character in their names (E=English, G=German, and so on).

**Table 315 ISPF Online Options**

| Option | Screen Title     | Module/<br>CLIST | Screen<br>Member | Screen Member with<br>JOBSCAN Support | PFKey<br>Member |
|--------|------------------|------------------|------------------|---------------------------------------|-----------------|
| 6      | ISPF – UTILITIES | IOAIUTI          |                  |                                       |                 |
|        | M                |                  | CTMPUTI          | CTMPUTIJ                              |                 |
|        | D                |                  | CTDPUTI          |                                       |                 |
|        | T                |                  | CTTPUTI          |                                       | CTTPTH          |
|        | M+D              |                  | CTMPUTID         | CTMPUTIX                              |                 |
|        | D+T              |                  | CTTPUTID         |                                       | CTTPTH          |
|        | M+T              |                  | CTTPUTIM         | CTTPUTIN                              | CTTPTH          |

| Option | Screen Title                    | Module/<br>CLIST | Screen<br>Member | Screen Member with<br>JOBSCAN Support | PFKey<br>Member |
|--------|---------------------------------|------------------|------------------|---------------------------------------|-----------------|
|        | M+D+T                           |                  | CTTPUTIS         | CTTPUTIX                              | CTTPUTH         |
|        | M+B                             |                  | CTMPUTI          | CTMPUTIJ                              |                 |
|        | D+B                             |                  | CTDPUTI          |                                       |                 |
|        | B+T                             |                  | CTTPUTI          |                                       | CTTPUTH         |
|        | M+D+B                           |                  | CTMPUTID         | CTMPUTIX                              |                 |
|        | D+B+T                           |                  | CTTPUTID         |                                       | CTTPUTH         |
|        | M+B+T                           |                  | CTTPUTIM         | CTTPUTIN                              | CTTPUTH         |
|        | M+D+B+T                         |                  | CTTPUTIS         | CTTPUTIX                              | CTTPUTH         |
| D1     | Decollating                     | CTDMISRQ         |                  |                                       |                 |
| D2     | Printing                        | CTDMISRQ         |                  |                                       |                 |
| D3     | Backup/Migration                | CTDMISRQ         |                  |                                       |                 |
| D4     | Restore                         | CTDMISRQ         |                  |                                       |                 |
| I1     | Prerequisite<br>Conditions      | IOACCND          |                  |                                       |                 |
| M1     | Job Order Issue                 | CTMJOBRO         |                  |                                       |                 |
| M2     | AutoEdit Simulation             | CTMCAES          | CTMPROMP         |                                       |                 |
| M3     | Simulation/Tape Pull            | CTMCSIM          |                  |                                       |                 |
| M4     | Parameter<br>Prompting          |                  |                  |                                       |                 |
| M5     | Quick Schedule                  | CTMQUICK         |                  |                                       |                 |
| M6     | User Interface                  | CTMJBINT         |                  |                                       |                 |
| R1     | Control-M/Restart<br>Simulation | CTRCSIM          |                  | CTRPSIM                               |                 |
| R2     | Dataset Cleanup                 | CTRCCLN          |                  | CTRPCLN                               |                 |
| R3     | Job Dataset List                | CTMJDSN          |                  | CTMPJDSN                              |                 |

| Option | Screen Title                 | Module/<br>CLIST | Screen<br>Member | Screen Member with<br>JOBSCAN Support | PFKey<br>Member |
|--------|------------------------------|------------------|------------------|---------------------------------------|-----------------|
| R4     | Standalone                   | CTRCCTR          |                  | CTRPCTR                               |                 |
| T1     | Control-M/Tape<br>Simulation | CTTCRSS          |                  |                                       |                 |
| U1     | DOCU/TEXT                    | D00YDMU          |                  |                                       |                 |



## F General Use Assembler Macros and Modules

This section describes the assembler macros and modules provided with INCONTROL products. Each macro and module is described in detail in alphabetical order.

### CTMCOD Assembler Macro

The CTMCOD macro performs the following functions:

- extracts a code block from the MIT/MIC codes area
- writes a modified code block back into the MIT/MIC codes area
- adds a new code to the MIT/MIC codes area

Shown below are the environmental factors required for proper operation of the CTMCOD assembler macro:

- The CTMBCOD data area must be addressable to the program issuing the CTMCOD macro.
- Before invoking the CTMCOD macro, the issuing program must be in AMODE 31.

### Syntax

CTMCOD Assembler Macro

**name**

**CTMCOD <function>**

**, CODE=requested code type**

**, CONTIG=[ Y/N]**

**, MIT=address of MIT**

**, MCT=address of MCT**

**, NOTOK=label**

**, OK=label**

## Parameters

**Table 316 CTMCOB Parameters**

| Parameter            | Description and Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>name</i>          | Symbolic name. The name, if specified, must begin in column 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| CTMCOB               | Keyword CTMCOB. One or more blanks must precede and follow the CTMCOB keyword.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>function</i>      | <p>Valid values:</p> <ul style="list-style-type: none"> <li>INIT - Initializes the search for a specific code. It must be issued when a new code type is searched for, or when starting a search of the codes area (when no specific code is requested). It does not actually extract the first code of the requested type.</li> <li>GETNEXT - Extracts the next instance of the requested code, or, if no specific code is requested, the next code of the job. The extracted code is placed in field CODOUTC of data area CTMBCOB.</li> <li>PUT - Writes a modified code back to the MIT/MIC codes area. The code to be written back must be extracted through the INIT or GETNEXT function, and remain in field CODOUTC of data area CTMBCOB. The code's ID and length must not be modified. The PUT invocation must immediately follow the INIT or GETNEXT invocation.</li> <li>ADD - Adds a code to the end of the job's MIT/MIC code area. The code to be added must be placed in field CODOUTC of data area CTMBCOB. The code is only added if there is enough free space in the job's MIT/Miss concatenation.</li> </ul> |
| ,CODE=code           | Specifies the type of code requested from INIT or GETNEXT functions. Optional. If omitted, no specific code type is requested.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ,CONTIG=[Y N]        | <p>Indicates if the job's MIT/Miss reside in a contiguous storage area or are chained.</p> <ul style="list-style-type: none"> <li>Y (Yes) - The job's MIT/MICs reside in a contiguous storage area. Default.</li> <li>N (No) - The job's MIT/MICs are chained using a double-pointing method (i.e., the first full word points to the previous record, the second full word points to the next record and the MIT/MIC itself starts after these pointers).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| ,MIT= <i>mitaddr</i> | MIT address of the job. Optional. If omitted, the MIT must be addressable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Parameter            | Description and Values                                                                                                   |
|----------------------|--------------------------------------------------------------------------------------------------------------------------|
| ,MCT= <i>mctaddr</i> | MCT address of the job. Optional. If omitted, the MCT must be addressable.                                               |
| ,NOTOK= <i>label</i> | The address to branch to when the requested code was not found or the function has not completed successfully. Optional. |
| ,OK= <i>label</i>    | The address to branch to when the requested function has completed successfully. Optional.                               |

Parameters NOTOK and OK are optional and mutually exclusive.

## Output Register Information

When control returns to the caller from CTMCOD, the general purpose registers (GPRs) contain the following values:

**Table 317 Output Register Information**

| Register | Contents                          |
|----------|-----------------------------------|
| 0        | Unchanged                         |
| 1        | Used as a work register by CTMCOD |
| 2–13     | Unchanged                         |
| 14       | Used as a work register by CTMCOD |
| 15       | Contains the CTMCOD return code   |

## Return Codes

**Table 318 Return Codes from the CTMCOD INIT Function**

| Return Code | Meaning                       |
|-------------|-------------------------------|
| 0           | Successful completion         |
| 8           | Requested code does not exist |
| 20          | Severe error                  |

**Table 319 Return Codes from the CTMCOD GETNEXT Function**

| Return Code | Meaning                                                                                                     |
|-------------|-------------------------------------------------------------------------------------------------------------|
| 0           | Successful completion                                                                                       |
| 8           | No more codes of requested type exist. If no specific code type was requested, the end of codes was reached |
| 20          | Severe error                                                                                                |

**Table 320 Return Codes from the CTMCOD PUT Function**

| Return Code | Meaning                    |
|-------------|----------------------------|
| 0           | Successful completion      |
| 8           | Code ID or length modified |
| 20          | Severe error               |

**Table 321 Return Codes from the CTMCOD ADD Function**

| Return Code | Meaning                            |
|-------------|------------------------------------|
| 0           | Successful completion              |
| 8           | Not enough free space for new code |
| 20          | Severe error                       |

**Table 322 User Abends**

| User Abend Code | Meaning                                              |
|-----------------|------------------------------------------------------|
| 0009            | Pointer to module CTMCOD (in MCT) is not initialized |

For an example of how to use the CTMCOD, see Sample Exit CTMX002H in the IOA SAMPEXIT library.

## IOAENV Assembler Macro

The IOAENV macro initializes the IOA environment by performing the following functions:

- Locate an area for the MCT and builds member IOAPARM into it.
- Provide parameters for dynamic allocation.
- Optionally build requested xxxPARMs.
- Optionally build requested xxxPLEXs.
- Optionally open LOG or LOG-in-Memory.
- Optionally initialize the messages environment, optional wishes environment, and trace options.

## Syntax

The standard format of the IOAENV macro is shown below.

### Syntax for IOAENV Macro

```

=====
name      symbol. Begin name in column 1. One or more blanks must precede IOAENV
IOAENV    One or more blanks must follow IOAENV
=====
INIT      Build MCT.
SERV[, MCTADDR=field]  Add services/xxxPARMs.
REFR[, MCTADDR=field]  Refresh xxxPARM (except IOAPARM). Delete the loaded xxxPARM and load it again.
TERM[, MCTADDR=field]  Delete all loaded xxxPARMs and terminate all initialized services.
                        If MCTADDR is omitted, then we assume to have addressability for the MCT.
                        Note: Only one MCT is handled by the macro. If it does not exist, then one is built.
,PARMS=   p          Parameter letter.
          (p1, p2, ..., pn) Parameter letters.
          area        An area within the program that contains pairs of parameter letter and parameter suffix. For example:
                        area DC C' M3D5R8', X' FF
                        (use CTMPARM3; CTDPRM5; CTRPARM8)

                        Note: Each xxxPARM is loaded (with IOALDPRM) and it's address is saved in the MCT. For IOA, CTM,
                        CTD, CTR and ECS the fixed part of the loaded xxxPARM is copied to the MCT.

,PLEX=    p          xxxPLEX letter.
          (p1, p2, ..., pn) xxxPLEX letters.
          area        An area within the program that contains pairs of plex letter and plex suffix.

                        Note Each xxxPLEX is loaded (with IOALDPRM) and it's address is saved in a table of addresses. The address
of this table is saved in MCTPLEXT field.

,CMEM=    YES/NO     If CMEM=YES then CMMPARM is loaded if Control-0 is NOT installed

,MSG=     YES/NO     Initialize the messages environment.

,WISH=    YES/NO     Initialize the optional wishes environment.

,TRACE=   YES/NO     Initialize trace options.

,LOG=     NO         LOG not required.
          LOG        Open LOG.
          CHN        Open LOG-in-MEMORY for 500 records.

,MCT=     Rx         Default: R12
                  NONE Unless MCT=NONE is coded, on return from INIT function the following commands are generated:
                  LR Rx, R1
                  USING MCTSTART, Rx

,LOC=     BELOW/ANY  Where all the GETMAIN(s) needed for the services will be done

,ERRET=   label      Label of error routine (see return codes).
                  If ERRET is omitted, an ABEND will be used.

,DUMP=    YES/NO     Issue IOADUMP macro.
                  This macro issues ESTAE and prints mini-dump at ABEND time.

,ALLOC=   (a1, a2, ..., an) List of Allocation Member Names.

,FREE=    (f1, f2, ..., fn) List of Allocation Member Names.

,SP=      sp         A one byte area containing the subpool number
                  If omitted, the default (I32) is used

,RAREA=   area       Support area for PARMS/PLEX in reentrant programs.

```

## Output Register Information

**Table 323     Output Register Information**

| Register | Description                                                                                                                                                                                        |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R1       | MCT address.                                                                                                                                                                                       |
| R15      | Return Codes<br>0 -- OK, all requests honored.<br>8 - Error. Message was issued. TERM is required.<br>12 - Severe Error. Message was issued. Skip TERM.<br>16 - LOAD for IOAENV failed. Skip TERM. |

## IOAMEM Assembler Macro

The IOAMEM Assemble Macro module is a general purpose library– and member–handling program that can handle fixed or variable-length format libraries (of any record length). It transfers information from the library or member to memory, and back.

IOAMEM uses dynamic allocation, so usually no pre-allocation is required. However, IOAMEM can work on pre-allocated DD statements also, in which case the DD statements must be concatenated.

## General Description

The IOAMEM module attributes are

RENT, AMODE=31 RMODE=24

Upon entry, the value of AMODE is saved. AMODE is set to 31 to handle addresses above the 16MB line. Upon return, the original value of AMODE is restored.

Storage for the handler is obtained below the 16 MB line and is saved in the handler address. The caller must not modify the handler address between the first call and the FINISH request call to module IOAMEM.

The handler address is returned in field IMHNDLR, which is mapped by macro IOAMMEM.

When invoking macro IOAMEM with parameter HANDLE=addr, the field that contains the handler address is not modified by macro IOAMEM. If more than one handler is used in the same program, save the handler address and invoke macro IOAMEM with the proper handler address in parameter HANDLE=addr.

It is not necessary to provide a buffer address for GETMEM, DIRECTOR and DIRFULL requests.

If the buffer address is not passed (field value is zero), module IOAMEM obtains storage above or below the 16MB line. The number of records in the storage buffer is determined as follows:

- If field RECNUM (IMRECNUM) is not zero, then the number of records is the value in field RECNUM (IMRECNUM).
- If field RECNUM (IMRECNUM) is zero, then the default number of records is 5000.

The actual buffer size is the number of records in the buffer times the LRECL of the input dataset, plus 16 bytes for the header.

Module IOAMEM does not free any buffer the caller uses. If module IOAMEM obtains a storage buffer address on behalf of a caller, the caller must free this storage. The caller can free the buffer by using macro IOAXAGR. Field IMBUFARD points to the real buffer address + 16 bytes. The length of the buffer is in offset 4 from the beginning of the header.

If the buffer address is passed (field value is not zero), IOAMEM treats the value of IMRECNUM as the actual buffer size (in records). Therefore, to prevent storage protection violations, do NOT specify a value of IMRECNUM that exceeds the actual buffer size (in records).

If the buffer address is passed (field value is not zero) and the buffer size is insufficient, module IOAMEM ends with a return code of 08 and a reason code of 24. The actual number of records the member contains is returned in field IMRECNUM.

If the buffer address is not passed (field value is zero), module IOAMEM returns with a buffer that contains the entire member. The number of records in the buffer is returned in field IMRECNUM.

Macro IOAMEM checks whether parameter IOAMEMA has been supplied. If this parameter has been supplied, macro IOAMEM uses the supplied address. Otherwise, macro IOAMEM loads the IOAMEM module before invoking it and deletes it upon return.

GETMEM, GETLINE and PUTMEM requests support reading and writing members with record lengths other than 80 bytes. The GETLINE request can read members with variable record lengths.

The DIRECTOR and DIRFULL functions accept a member name in the MEMBER sub-parameter of the IOAMEM macro. The member name may include masking characters. For example

```
MEMBER==CL8 ' * '
```

All members are included in the directory list (the same as a null MEMBER= parameter or MEMBER=0)

```
MEMBER==CL8 ' A? * '
```

All members that begin with the character A and have a total length of at least 2 characters are included in the directory list.

The FINISH request cleans up the environment, closes all opened DCBs, and frees all I/O buffers and the handler storage.

Module IOAMEM must be called with a FINISH request. Otherwise, some DCBs may remain open and some storage buffers may remain allocated.

The parameter list passed to IOAMEM is mapped by the IOAMMEM macro as follows:

**Table 324 Mapping of Parameter List by IOAMMEM Macro**

| Type   | Field Name | Input/Output Fields         | Length                     |
|--------|------------|-----------------------------|----------------------------|
| In     | IMREQ      | Request/Function            | CL8                        |
| In/Out | IMHNDLR    | Handler address             | AL4                        |
| In/Out | IMBUFADR   | Buffer address              | AL4                        |
| In/Out | IMRECNUM   | Buffer size in records unit | AL4                        |
| In     | IMFRMREC   | Read from record number     | AL4                        |
| In     | IMMCTADR   | MCT address                 | AL4                        |
| In     | IMDSNAME   | Dataset name                | CL44                       |
| In     | IMMEMBER   | Member name                 | CL8                        |
| In     | IMDDNAME   | DD name                     | CL8                        |
| In     | IMUSERID   | User ID                     | CL8                        |
| In     | IMBUFFMT   | Buffer format               | CL1 Vector/Double pointers |
| In     | IMACT      | Action for PUTMEM           | CL1 Add/Replace            |
| In     | IMISPFS    | ISPF statistics             | CL1 Yes/No/Blank           |
| In     | IMBFLOC    | Buffer location             | CL1 Above/Below            |
| In     | IMESTAE    | ESTAE                       | CL1 Yes/No                 |
| In     | IMDUMP     | DUMP when ESTAE is yes      | CL1 Yes/No                 |
| Out    | IMRC       | Return code                 | AL2                        |
| Out    | IMRSN      | Reason code                 | AL2                        |
| Out    | IMLRECL    | LRECL of dataset            | AL2                        |
| Out    | IMBLKSIZ   | Blocksize of dataset        | AL2                        |
| Out    | IMRECFM    | RECFM of dataset            | CL2                        |
| Out    | IMDSORG    | DSORG of dataset            | CL2                        |
| Out    | IMABENDC   | Abend code                  | CL10                       |



**Table 325      Return Codes and Reason Codes**

| RC | RSN                   | DIRFULL                                             | DIRECTOR                | DELMEM                                     | MEMSTAT               |
|----|-----------------------|-----------------------------------------------------|-------------------------|--------------------------------------------|-----------------------|
| 00 | 00                    | OK                                                  | OK                      | OK                                         | OK                    |
| 04 | 00                    |                                                     |                         |                                            |                       |
|    | 04                    |                                                     |                         | Requested member does not exist in dataset |                       |
| 08 | 00                    | Directory list is empty                             | Directory list is empty | Member name has not been supplied          | Same                  |
|    | 04                    | Dataset is not PDS or PDSE                          | Same                    | Same                                       | Same                  |
|    | 08                    | Insufficient storage<br>GETMAIN failed              | Same                    | Same                                       | Same                  |
|    | 12                    | OPEN for dataset failed                             | Same                    | Same                                       | Same                  |
|    | 16                    |                                                     |                         |                                            |                       |
|    | 20                    |                                                     |                         |                                            | Member does not exist |
|    | 24                    | Buffer is full<br>Actual number of records returned | Same                    |                                            |                       |
|    | 28                    |                                                     |                         | ENQ failed                                 |                       |
|    |                       |                                                     |                         |                                            |                       |
| 12 | Reason code from STOW |                                                     |                         | STOW for DELETE failed                     |                       |

**Table 326      Return Codes and Reason Codes (GETMEM, GETLINE, PUTMEM)**

| RC | RSN                   | GETMEM                                              | GETLINE             | PUTMEM                                                          |
|----|-----------------------|-----------------------------------------------------|---------------------|-----------------------------------------------------------------|
| 00 | 00                    | OK                                                  | OK                  | OK                                                              |
| 04 | 00                    |                                                     | End of file reached |                                                                 |
|    | 04                    |                                                     |                     | Replace was specified for a non-existing member, changed to Add |
| 08 | 00                    | Member name has not been supplied                   | Same                | Same                                                            |
|    | 04                    | Dataset is not PDS or PDSE                          | Same                | Same                                                            |
|    | 08                    | Insufficient storage<br>GETMAIN failed              | Same                | Same                                                            |
|    | 12                    | OPEN for dataset failed<br>or<br>RDJFCB failed      | Same                | Same                                                            |
|    | 16                    | RECFM is not F or FB                                |                     | Same                                                            |
|    | 20                    | Requested member does not exist                     | Same                | Add was specified for an existing member                        |
|    | 24                    | Buffer is full<br>Actual number of records returned |                     |                                                                 |
|    | 28                    |                                                     |                     | ENQ failed                                                      |
| 12 | Reason code from STOW |                                                     |                     | STOW for ADD/REPLACE failed                                     |

**Table 327 Return Codes and Reason Codes (ALLOC, DEALLOC)**

| RC | RSN | ALLOC                       | DEALLOC                 |
|----|-----|-----------------------------|-------------------------|
| 00 | 00  | OK                          | OK                      |
| 04 | 00  |                             | DDNAME is not allocated |
| 08 | 00  | DDNAME is already allocated |                         |

**Table 328 Return Codes, Reason Codes and Descriptions**

| RC | RSN | Description                                                              |
|----|-----|--------------------------------------------------------------------------|
| 16 | 00  | Unknown request type                                                     |
|    | 04  | Neither dsname nor ddname have been supplied                             |
|    | 08  | Requested dataset is not cataloged                                       |
|    | 12  | Dynamic allocation failed for the requested dataset                      |
|    | 16  | ESTAE caught an ABEND                                                    |
|    | 20  | The requested DSNAME is not in the concatenation of the given DDNAME.    |
|    | 24  | Requested dataset does not exist on the volume pointed to by the catalog |
|    | 28  | Dynamic allocation/deallocation failed for the requested dataset/ddname  |
|    | 32  | Requested dataset is migrated by HSM                                     |

**Table 329 Return Codes and Reason Codes from Librarian/Panvalet**

| RC | RSN | All functions                              |
|----|-----|--------------------------------------------|
| 20 | 04  | EOD reached                                |
|    | 08  | Open failed for Librarian/Panvalet dataset |
|    | 12  | Member not found                           |
|    | 16  | Read record error                          |

## Function Codes

The following function codes are supported by the IOAMEM module:

**Table 330 Function Codes Supported by IOAMEM Module**

| Function Code | Description                                         |
|---------------|-----------------------------------------------------|
| INIT          | Set up the handler (optional).                      |
| DELMEM        | Delete an existing member.                          |
| DIRECTOR      | Retrieve the directory entry for a given dataset.   |
| DIRFULL       | Retrieve the full directory to a buffer.            |
| ENDLIBDE      | Close the last input member processed.              |
| FINISH        | Close last member and deallocate the library.       |
| GETLINE       | Read a member line by line.                         |
| GETMEM        | Get a whole member into a buffer.                   |
| INITMEM       | Prepare a member for GETLINE request.               |
| MEMSTAT       | Retrieve ISPF statistics for a given member.        |
| PUTMEM        | Write a whole member to a library.                  |
| ALLOC         | Allocates a dataset and returns the dataset values. |
| DEALLOC       | Deallocate a specific DDNAME.                       |

To map the parameter list, use the IOAMEM macro with the following format:

|                                         |
|-----------------------------------------|
| <b>[name]</b> IOAMEM DSECT=[ NO   YES ] |
|-----------------------------------------|

To invoke the IOAMEM module, specify the IOAMEM macro with the following parameters:

**IOAMEM Macro Parameters**

|                         |                               |
|-------------------------|-------------------------------|
| [name] IOAMEM request,  | Request type                  |
| HANDLE=,                | Handler address               |
| BUFFADR=,               | Buffer address                |
| RECNUM=0,               | Number of records in buffer   |
| FROMREC=0,              | Read from record number       |
| MCTADDR=0,              | MCT address                   |
| DSNAME=,                | DSNAME                        |
| MEMBER=,                | Member name                   |
| USERID==CL8' IOAUSER' , | User ID                       |
| BUFFRMT=V,              | Buffer format                 |
| ACTION=A,               | Action for PUTMEM             |
| ISPFSTAT=Y,             | ISPF statistics for PUTMEM    |
| BUFFLOC=A,              | Buffer location               |
| ESTAE=Y,                | ESTAE request                 |
| DUMP=N,                 | DUMP option when ESTAE is yes |
| IOAMEMA=,               | Location of IOAMEM address    |

MF=[ L | E | (E, label) ]

**Table 331 Parameter Explanation**

| Parameter    | Description                                                       |
|--------------|-------------------------------------------------------------------|
| Request      | See the IOAMEM Macro Parameters code above.                       |
| HANDLE=addr  | Address or register (2) - (12) used as input and output           |
| BUFFADR=addr | Address or register (2) - (12) used as input and output           |
| RECNUM=addr  | Address or register (2) - (12) or number used as input and output |
| FROMREC=addr | Address or register (2) - (12)                                    |
| MCTADDR=addr | Address or register (2) - (12)                                    |
| DSNAME=addr  | Address or register (2) - (12)                                    |
| MEMBER=addr  | Address or register (2) - (12)                                    |
| DDNAME=addr  | Address or register (2) - (12)                                    |
| USERID=addr  | Address or register (2) - (12)                                    |
| BUFFMT=value | V or D or address for GETMEM and PUTMEM only                      |
| ACTION=value | A or R or address for PUTMEM only                                 |

| Parameter      | Description                                             |
|----------------|---------------------------------------------------------|
| ISPFSTAT=value | Y or N or address for PUTMEM only                       |
| BUFFLOC=value  | A or B or address                                       |
| ESTAE=value    | Y or N or address                                       |
| DUMP=value     | Y or N or address                                       |
| IOAMEMA=addr   | Address or register (2) - (12)                          |
| ENQ=value      | N (none), P (partial), F (full – including member name) |

## Examples

### Assembler Macro Module Examples

```

LOAD EP=IOAMEM
ST R0, MEMADR
IOAMEM GETMEM,
  DDNAME=0,
  RECNUM=1000,
  DSNAME==CL44' N22. LI B. CNTL' ,
  MEMBER==CL8' TESTX' ,
  ESTAE=Y,
  DUMP=N,
  IOAMEMA=MEMADR,
  MF=E,
  MCTADDR=0

MVC HANDLE, IMHNDLR save handler address

IOAMEM GETMEM,
  HANDLER=HANDLE,
  BUFFADR=0,
  RECNUM=RECNUM,
  DDNAME=DDNAME,
  DSNAME=DSNAME,
  MEMBER=MEMBER,
  ESTAE=Y,
  DUMP=N,
  IOAMEMA=MEMADR,
  MF=E,
  MCTADDR=0

HANDLE DS A

```

```

DDNAME DC CL8' DD1'
DSNAME DC CL44' MY. DSNAME'
MEMBER DC CL8' MEMBER1'

RECNUM DC A(10000)

```

## G Customizing the Control-M Active Environment Screen

Display types for Control-M Active Environment screens can be customized for local language, local site terminology, ease of use, and so on, using the following methods:

- **Modifying the \$\$ACT Member:** This is the preferred method. By modifying member \$\$ACT in the IOA MSGENG, you can modify the following screens:
  - Screen 3
  - Screen 3.N
  - Screen 3.G
  - History screen
- **Modifying Definitions in Members Containing Assembler Macro Instructions:** This is the standard method. By modifying definitions in members containing Assembler macro instructions, which must be assembled and link-edited to create a CSECT and module with a name identical to the screen member name. For more information, see [IOA Administration](#) (on page 35).

### Modifying the \$\$ACT Member

This method is similar to customizing IOA display format members. For more information regarding the Display Type facility, see the topic about customizing IOA display format members in see [IOA Administration](#) (on page 35).

Before changing this member, review member \$\$ACTDOC in the IOA MSGENG library.

The \$\$ACTDOC member contains four sections, each of which describes how to change parts of each screen display:

- **Screen Fields:** For improving and customizing display types (header and bottom line fields, and job related fields).
- **Status Area Color:** For changing the color of jobs according to their status.
- **Filter Fields:** For creating and modifying filters.
- **CLASS of Bottom Lines:** For changing the primary and/or bottom lines on each screen (that is, Active, Net, Group, and History).

If Control-M/Enterprise Manager is installed at your site, care must be taken when changing the constants Filter and Order-ID. The Control-M/Enterprise Manager KSL (ECSKSL) accesses these constants, and if they are changed (for example, making all letters uppercase), KSL must be changed as well.

## Modifying Definitions in Members Containing Assembler Macro Instructions

### Screen Fields

The following tables list the fields that can be displayed in the Active Environment screen (Screen 3). Header line and bottom line fields do not vary by display type. Job related fields do vary by display type.

**Table 332 Header and Bottom Line Fields**

| Field Name | Field Length | Where Used<br>(As supplied) | Details                                                                                                                         |
|------------|--------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| ACTAFILT   | 9            | Title line                  | Active filter.                                                                                                                  |
| ACTBTIM    | 8            | Bottom line                 | Current time.                                                                                                                   |
| ACTCPID    | 4            | Unused                      | CPU-ID where the user is working                                                                                                |
| ACTDTYP    | 3            | Title line                  | Current Display Type.                                                                                                           |
| ACTTDIS    | 7            | Title line                  | Display mode (Active, History, Network, or Group) In History mode, the word History is displayed in red.                        |
| ACTTIND    | 7            | Title line                  | Dump ON indication. In regular mode, it contains only dashes. If the Dump status is ON, the text 'DUMP ON' is displayed in red. |
| ACTTITL    | 7            | Title line                  | Display details (Environment, memname).                                                                                         |
| ACTTMST    | 4            | Title line                  | Control-M status (UP, DOWN).                                                                                                    |
| ACTTUPD    | 8            | Unused                      | Last time the Refresh NET was handled.                                                                                          |



**Table 333 Job Related Fields**

| Field Name | Field Length | Where Used<br>(As supplied) <sup>a</sup> | Details                                                                                                                                                                                                                                                                                                                |
|------------|--------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACTDDIN    | 4            | <A> <N>                                  | DUE IN.                                                                                                                                                                                                                                                                                                                |
| ACTDDUT    | 4            | <A> <N>                                  | DUE OUT.                                                                                                                                                                                                                                                                                                               |
| ACTDGRP    | 20           | <A>                                      | Group. (Also displayed in the STATUS field if command Group was issued.)                                                                                                                                                                                                                                               |
| ACTDING    | 1            | <A>                                      | IN SMART Table indicator (T, _). 'T' indicates a SMART Table Entity or a job ordered in a SMART Table.                                                                                                                                                                                                                 |
| ACTDJNM    | 16           | <A> <D>                                  | Job name/Job ID.                                                                                                                                                                                                                                                                                                       |
| ACTDLAT    | 1            | <A> <N>                                  | Late indicator (Input, eXecuting/Out).                                                                                                                                                                                                                                                                                 |
| ACTDLPS    | 4            | <A> <N>                                  | Job average elapsed time.                                                                                                                                                                                                                                                                                              |
| ACTDMCC    | 24           | <A>                                      | Max-RC (STEP.PROC).                                                                                                                                                                                                                                                                                                    |
| ACTDNAM    | 8            | <A> <D>                                  | Job MEMNAME.                                                                                                                                                                                                                                                                                                           |
| ACTDNNA    | 27           | <N>                                      | <p>Nesting Level &amp; Name of job. This field is meaningful only under NET display. The Root job is displayed in the left-most position. Successor and predecessor jobs are aligned to the right according to level.</p> <p>Example:</p> <pre> 2  Pred2 1    Pred1 =&gt;      Root +1      Succ1 +2      Succ2 </pre> |
| ACTDNNM    | 27           | Unused                                   | <p>Nesting Level &amp; Name of job. This field is meaningful only under NET display. The Root job is centered. Predecessor jobs are aligned to the left and successor jobs are aligned to the right according to level, for example:</p> <pre> 2  Pred2 1    Pred1 =&gt;      Root +1      Succ1 +2      Succ2 </pre>  |
| ACTDNOD    | 8            | Unused                                   | NJE Node ID.                                                                                                                                                                                                                                                                                                           |

| Field Name | Field Length | Where Used<br>(As supplied) <sup>a</sup> | Details                                                                                                                                                                   |
|------------|--------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACTDODT    | 6            | <A> <D>                                  | Job ODATE.                                                                                                                                                                |
| ACTDORD    | 5            | <A>                                      | Order-ID. (Also displayed in the STATUS field if command ORDER was issued.)                                                                                               |
| ACTDOWN    | 8            | <A> <D>                                  | Job owner.                                                                                                                                                                |
| ACTDPRI    | 2            | <A> <N>                                  | Job Priority.                                                                                                                                                             |
| ACTDRBA    | 6            | <A>                                      | Job's RBA in the AJF.                                                                                                                                                     |
| ACTDRES    | 1            | <A> <N>                                  | Resource use indicator (Y, _). NET display: Quantitative or Control resource. All other displays: In Condition, Out Condition, Quantitative Resource or Control Resource. |
| ACTDRUN    | 5            | Unused                                   | Run number.                                                                                                                                                               |
| ACTDTMF    | 4            | <A>                                      | Time FROM.                                                                                                                                                                |
| ACTDTMU    | 4            | <A>                                      | Time UNTIL.                                                                                                                                                               |
| ACTJTYP    | 3            | <A> <D>                                  | Task type.                                                                                                                                                                |
| ACTSTAT    | 288          | <A> <D> <N>                              | Jobs status. Multiple line field composed of 9 sub-fields, each of which is 31 characters with one blank at the end. Under <N>, only the first 16 bytes are displayed.    |

<sup>a</sup> <A>, <D> and <N> represent DI A, DI D and DI N, respectively.

## Color Fields

The following table lists the fields that affect the color of the status area (field ACTSTAT). To change a color for a specific status, modify the appropriate field in the "General Constants" part of the \$\$ACT member. Only the following fields impact the color of the status area; all other fields in the "General Constants" part do not affect the color of the status area.

**Table 334 Color Fields**

| Field Name | Field Length | Current Color | Value of the Field         |
|------------|--------------|---------------|----------------------------|
| \$677      | 10           | GREEN         | Ended OK                   |
| \$810      | 9            | GREEN         | Forced OK                  |
| \$WRE      | 12           | YELLOW        | Wait Release               |
| \$REL      | 8            | YELLOW        | Released                   |
| \$671      | 15           | YELLOW        | Wait Submission            |
| \$672      | 14           | YELLOW        | Wait Execution             |
| \$673      | 9            | YELLOW        | Executing                  |
| \$687      | 9            | YELLOW        | Submitted                  |
| \$695      | 14           | YELLOW        | Going to Start             |
| \$697      | 7            | YELLOW        | Started                    |
| \$807      | 15           | YELLOW        | In Output Queue            |
| \$808      | 7            | YELLOW        | NJE Job                    |
| \$809      | 20           | YELLOW        | NJE Job<br>(ID changed)    |
| \$811      | 6            | YELLOW        | Active                     |
| \$801      | 17           | PINK          | Wait Confirmation          |
| \$NF1      | 13           | PINK          | Not found                  |
| \$692      | 15           | RED           | Ended Not OK               |
| \$682      | 23           | RED           | Failed - Reason Unk        |
| \$674      | 23           | RED           | Problems Reading<br>Sysout |

| Field Name | Field Length | Current Color | Value of the Field |
|------------|--------------|---------------|--------------------|
| \$679      | 13           | RED           | Not Submitted      |
| \$680      | 11           | RED           | Disappeared        |
| \$LTE      | 16           | RED           | (Late Executing)   |
| \$LAT      | 6            | RED           | (Late)             |
| \$LTS      | 17           | RED           | (Late Submission)  |
| \$696      | 11           | RED           | Not Started        |
| \$804      | 14           | RED           | Term - Stop job    |
| \$812      | 10           | RED           | In Error           |

## Filter Fields

Predefined and user-defined filters are composed of various fields. The following table lists all the fields that can be specified as part of such filters:

"From" and "To" ODATE values are not part of the filtering mechanism.

**Table 335 Filter Fields**

| Field Name | Field Length | Used For         |
|------------|--------------|------------------|
| SACTSM1    | 8            | 1st Memname      |
| SACTSM2    | 8            | 2nd Memname      |
| SACTSM3    | 8            | 3rd Memname      |
| SACTSM4    | 8            | 4th Memname      |
| SACTSM5    | 8            | 5th Memname      |
| SACTGR1    | 20           | 1st Group        |
| SACTGR2    | 20           | 2nd Group        |
| SACT700    | 1            | 'In Process' Y/N |
| SACT701    | 1            | 'Ended' Y/N      |
| SACT702    | 1            | 'State' Y/N      |

| Field Name | Field Length | Used For              |
|------------|--------------|-----------------------|
| SACT703    | 1            | 'Wait Sched' Y/N      |
| SACT704    | 1            | 'Ended "OK"' Y/N      |
| SACT705    | 1            | 'Free' Y/N            |
| SACT723    | 1            | 'Wait Confirm' Y/N    |
| SACT707    | 1            | 'Not OK' Y/N          |
| SACT708    | 1            | 'Held' Y/N            |
| SACT706    | 1            | 'Wait SUB' Y/N        |
| SACT710    | 1            | 'Rerun' Y/N           |
| SACT711    | 1            | 'On Request' Y/N      |
| SACT709    | 1            | 'Submitted' Y/N       |
| SACT713    | 1            | 'Disappeared' Y/N     |
| SACT714    | 1            | 'Deleted' Y/N         |
| SACT712    | 1            | 'Wait Exec' Y/N       |
| SACT716    | 1            | 'Abended' Y/N         |
| SACT715    | 1            | 'Executing' Y/N       |
| SACT719    | 1            | 'Unexpected CC' Y/N   |
| SACT718    | 1            | 'On Output Queue' Y/N |
| SACT722    | 1            | 'JCL Error' Y/N       |
| SACTTPJ    | 1            | 'Job' Task Type Y/N   |
| SACTTPC    | 1            | 'Cyc' Task Type Y/N   |
| SACTTPE    | 1            | 'Emr' Task Type Y/N   |
| SACTTPS    | 1            | 'Stc' Task Type Y/N   |
| SACTTPD    | 1            | 'Cst' Task Type Y/N   |
| SACTTPY    | 1            | 'Est' Task Type Y/N   |

| Field Name | Field Length | Used For                |
|------------|--------------|-------------------------|
| SACTTPX    | 1            | 'Ecj' Task Type Y/N     |
| SACTTPZ    | 1            | 'Ecs' Task Type Y/N     |
| SACTTPW    | 1            | 'Wrn' Task Type Y/N     |
| SACTTPG    | 1            | 'Grp' Task Type Y/N     |
| SACTRE1    | 20           | 1st Resource            |
| SACTRE2    | 20           | 2nd Resource            |
| SACTRIN    | 1            | 'In' Res Type Y/N       |
| SACTROU    | 1            | 'Out' Res Type Y/N      |
| SACTRCO    | 1            | 'Conds' Res Type Y/N    |
| SACTRRS    | 1            | 'Resource' Res Type Y/N |
| SACTRCN    | 1            | 'Control' Res Type Y/N  |
| SACTUI1    | 8            | 1st Owner               |
| SACTUI2    | 8            | 2nd Owner               |
| SACTUI3    | 8            | 3rd Owner               |
| SACTUI4    | 8            | 4th Owner               |
| SACTUI5    | 8            | 5th Owner               |
| SACTPRI    | 2            | Priority                |

## CLASS of Bottom Lines

Each display has its own Primary and Alternate bottom lines. The Primary bottom line is always the first bottom line displayed when entering the screen. Command OPT toggles between the Primary and the Alternate bottom lines. As supplied, the Primary bottom line lists, beneath the display, the most important, valid options and commands. The Alternate bottom lines list all the valid options and commands beneath the display.

The CLASS of the @STYLE section that defines the bottom lines determines the appropriate Primary and Alternate bottom lines in each display (History, Net, and so on).

The following table lists the CLASS of Primary & Alternate bottom lines for each display, with and without Control-M/Restart installed:

**Table 336 CLASS of Primary and Alternate Bottom Lines**

| Display | CLASS with Control-M/Restart |           | CLASS without Control-M/Restart |           |
|---------|------------------------------|-----------|---------------------------------|-----------|
|         | Primary                      | Alternate | Primary                         | Alternate |
| Active  | A                            | 1         | A                               | 2         |
| Net     | B                            | 1         | B                               | 2         |
| Group   | B                            | 1         | B                               | 2         |
| History | A                            | 3         | N/A                             |           |

## H Control-O Monitor and CMEM Modify Commands

This section contains a table of descriptions and parameters for the Control-O Monitor and CMEM Modify commands.

**Table 337 Control-O Monitor and CMEM Modify Commands**

| Command     | Description                                             | Parameters                                                                       | CMEM |
|-------------|---------------------------------------------------------|----------------------------------------------------------------------------------|------|
| ABEND       | Terminate Control-O with abend                          |                                                                                  | Yes  |
| AUTOLOG     | Enable or disable the Automation log                    | =Yes/No                                                                          | No   |
| C           | Order the rules in a CMEM table                         | =LIB(table)                                                                      | Yes  |
| COSDB       | Set a COSMOS table to a specific mode of operation      | =TABLEID,xxxxxxx<br>where xxxxxxx = FREE<br>HELD<br>NOPRE<br>FORCE_OK<br>DISPLAY | No   |
| COSMOSSTART | Start COSMOS                                            |                                                                                  | No   |
| COSMOSSTOP  | Stop COSMOS                                             |                                                                                  | No   |
| D           | Delete a rule table                                     | =Yes/No                                                                          | Yes  |
| DISABLEALT  | Stop using alternate subsystem name                     |                                                                                  | Yes  |
| DISPCOMM    | Display Control-O network connections                   |                                                                                  | No   |
| DISPFILES   | Display the allocated file                              |                                                                                  | Yes  |
| DISPLAY     | Display 1st 1000 rules                                  |                                                                                  | Yes  |
| DUMPXAE     | Dump the Control-O areas of the Coupling facility (XES) |                                                                                  | Yes  |



| Command    | Description                                                                                   | Parameters                                                                                                                                                                                                                                                                                                                                                                                         | CMEM |
|------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| F          | Force Control-O table rules                                                                   | =LIB[(mem)],D=date<br>=ALL[,REBUILD]                                                                                                                                                                                                                                                                                                                                                               | No   |
| INTERVAL   | Change the Control-O sleeping interval                                                        | =ss<br>where <i>ss</i> is the number of seconds<br>(range: 1 – 99)                                                                                                                                                                                                                                                                                                                                 | Yes  |
| LOADGLOBAL | Load global variable memname from the global variable database or library                     | = <i>memname</i><br>where <i>memname</i> is a specific Global member or variable database                                                                                                                                                                                                                                                                                                          | Yes  |
| LOG        | Change the MODE of all the rules to TRIGGER or LOG, or reset all rules to their original mode | =ALL – set all rules to MODE LOG<br>=TRIGGER – set all rules to issue a trace record when a rule is triggered<br>=DEFAULT – set all rules back to the original MODE                                                                                                                                                                                                                                | Yes  |
| MODE       | Control-O mode of operation                                                                   | without parameters: display current MODE<br>=FREEZE – stop all Control-O actions<br>=LOGONLY – stop all Control-O actions, but log all rules that must be triggered<br>=TRIGGERONLY – stop only new rules from being triggered<br>=RESUME,CANCEL – reactivate Control-O operation but IGNORE all pending rules<br>=RESUME,CONTINUE – reactivate Control-O operation and CONTINUE all pending rules | Yes  |
| NEWCONLIST | Reload all CMEM tables from DACTMLST DDNAME                                                   |                                                                                                                                                                                                                                                                                                                                                                                                    | Yes  |

| Command       | Description                                                                          | Parameters                                                                                                                                                                                                                                                          | CMEM               |
|---------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| NEWDEST       | Reload the destination table                                                         |                                                                                                                                                                                                                                                                     | No                 |
| NEWMAILDT     | Reload the mail destination table                                                    |                                                                                                                                                                                                                                                                     | No                 |
| NEWSECDEF     | Reload security definitions                                                          |                                                                                                                                                                                                                                                                     | Yes                |
| O             | Order Control-O table rules                                                          | =LIB[(mem)],D=date<br>=ALL[,REBUILD]                                                                                                                                                                                                                                | No                 |
| REFRESH       | Sysplex and communication map                                                        | =XCF<br>Refresh Sysplex and communication (Control-O) map                                                                                                                                                                                                           | Yes (Sysplex only) |
| RELOAD        | Reload the Control-O executor module to apply maintenance without stopping Control-O | =xxxxx<br>where xxxxx is the name of the Control-O module that must be refreshed. Valid values are:<br>CTOAIDT, CTOWTO, CTOJFRQ (Control-O only) or the keyword, MESSAGES, which implies the messages used by these modules.                                        | Yes                |
| RESETSTAT     | Reset Control-O message statistics                                                   |                                                                                                                                                                                                                                                                     | No                 |
| RULETHRESHOLD | Set new values for the Control-O rules threshold                                     | =nnn where nnn is a number (0 through 999999)                                                                                                                                                                                                                       | No                 |
| SERVER        | Send a command to Control-O servers                                                  | =serverid,STOP – stop an active server<br>=serverid,START – start a failing server<br>=serverid,CANCEL – cancel active request<br>=serverid,FORCE – reset and stop the server<br>=serverid,TERM – terminate the server<br>=serverid,DISPLAY – display server status | No                 |

| Command  | Description                                           | Parameters                                                                                                                                                                                                                                                                         | CMEM |
|----------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| SETPARM  | Dynamically change CTOPARM or CMMPARM parameters      | <p>,WSC#<br/>set the value of WSC#<br/>,WSC# = rrrrr or + rrrr<br/>Add to be rrrrr WSCs blocks<br/>or<br/>Add additional rrrrr WSCs blocks<br/>,MAXWSC#<br/>get the value of MAXWSC#<br/>,MAXWSC# = rrrrr<br/>get the maximum number of WSCs that can be dynamically allocated</p> | Yes  |
| SHOWPARM | Display Control-O major blocks                        |                                                                                                                                                                                                                                                                                    | Yes  |
| SMODE    | Modify standalone mode when Control-M is also active  | <p>=F – force standalone operation<br/>=N – Control-O uses only Control-M to write to the IOA Log<br/>=Y – Control-O writes to the IOA Log using Control-M when Control-M is active; otherwise, Control-O writes to the IOA Log directly</p>                                       | Yes  |
| SNAP     | Take a snapshot dump of Control-O internal data areas | <p>=xxxxx<br/>where xxxxx is the list of blocks that can be snapped<br/>For more information see the topic about Control-O problem determination in Chapter 5, "Control-O"</p>                                                                                                     | Yes  |
| STARTAAO | Start the interface with AutoOPERATOR                 |                                                                                                                                                                                                                                                                                    | Yes  |

| Command      | Description                                                                                                                                          | Parameters                                                                                      | CMEM |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------|
| STARTCOMM    | Start Control-O communication through IOAGATE                                                                                                        |                                                                                                 | No   |
| STARTOE      | Start the Unix interface. ON DSNEVENT rules for files that are accessed through Unix for OS/390 or z/OS services (such as IBM FTP) are not triggered |                                                                                                 | Yes  |
| STARTSMS     | Start the SMS interface                                                                                                                              |                                                                                                 | No   |
| STARTSTAT    | Start Control-O message statistics                                                                                                                   |                                                                                                 | No   |
| STARTMVI     | Start the interface with the MAINVIEW Alarm product                                                                                                  |                                                                                                 | No   |
| STOP         | Stop the Control-O function and take down the Control-O monitor                                                                                      |                                                                                                 | Yes  |
| STOPAAO      | Stop the interface with AutoOPERATOR                                                                                                                 |                                                                                                 | Yes  |
| STOPCOMM     | Stop Control-O communication through IOAGATE                                                                                                         |                                                                                                 | No   |
| STOPMVI      | Stop the interface with the MAINVIEW Alarm product                                                                                                   |                                                                                                 | No   |
| STOPOE       | Stop the Unix interface                                                                                                                              |                                                                                                 | Yes  |
| STOPSMS      | Stop the SMS interface. ON SMS rules are not triggered.                                                                                              |                                                                                                 | No   |
| STOPSTAT     | Stop Control-O message statistics                                                                                                                    |                                                                                                 | No   |
| STORAGETABLE | Display Control-O E/CSA usage and the major Control-O module address                                                                                 |                                                                                                 | Yes  |
| SVCDUMP      | Make a Control-O monitor SVC dump.<br>Optional: To disable CTOZ01I dumps, code =CTOZ01I,DISABLE                                                      |                                                                                                 | Yes  |
| TRACE        | Activate Control-O internal trace using:<br>GTF for the subsystem interface<br>DATRACE and DADUMP in the Control-O monitor                           | = <i>nnn</i><br>where <i>nnn</i> is a number (000 through 255) supplied by BMC Customer Support | Yes  |

| Command     | Description                                                                                                                                                                                                                       | Parameters                                                                                                                                                                                                                                                         | CMEM       |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| USAGESTATS  | Display Internal Resource Utilization Statistics                                                                                                                                                                                  | = <i>type</i><br>where <i>type</i> is the type of a specific internal resource. For more information see <a href="#">Problem Determination</a> (on page 586)                                                                                                       | Yes        |
| WATERMARKS  | Display watermarks for Control-O internal elements and queues<br>Note: The functionality of this command is included within the USAGESTATS command. The WATERMARKS command is currently supported for compatibility reasons only. |                                                                                                                                                                                                                                                                    | Yes        |
| WISH=       | Enable or disable a Control-O or CMEM optional wish                                                                                                                                                                               | = <i>wish_id</i> ,ENABLE<br>= <i>wish_id</i> ,DISABLE<br><br>For more information about the Rule Definition Facility and ordering Rule Tables, see the online facilities chapter of the <i>Control-M for z/OS User Guide</i> and the <i>Control-O User Guide</i> . | Yes<br>Yes |
| WRITEGLOBAL | Save global variable memname into the global variable database or library                                                                                                                                                         | = <i>memname</i><br>where <i>memname</i> is a specific Global member or variable database                                                                                                                                                                          | Yes        |

## I Control-D/V diagnostic trace levels

This topic contains a partial listing of diagnostic trace levels available for Control-D and Control-V components. See [Internal Trace facility](#) (on page 178) for more information on the meaning of traces and how to set them. Do NOT set a trace unless specifically requested to do so by BMC Customer support.

**Table 338 Control-D/V IOA application server trace levels**

| Trace level | Trace action                                               |
|-------------|------------------------------------------------------------|
| 1           | Control-V Index files processing messages                  |
| 8           | Recipient tree search messages                             |
| 10          | Input and output request buffers                           |
| 11, 15      | Mailbox messages                                           |
| 12          | Application program calls and requests performance summary |
| 13          | User login messages                                        |
| 14          | Long request messages                                      |
| 17          | Report viewing messages                                    |
| 18          | Report viewing and printing messages                       |
| 19          | Report viewing messages                                    |
| 20          | CDAM interface messages                                    |
| 21, 22      | CDAM interface messages<br>Report list messages            |
| 23          | Report list messages<br>Report Workflow list messages      |
| 24          | Report list messages<br>Global Index access messages       |
| 25          | Note access messages                                       |

| Trace level | Trace action                                                                  |
|-------------|-------------------------------------------------------------------------------|
| 26          | Control-V Indexes access messages<br>Global Index access messages             |
| 28          | Global Index DB2 interface messages                                           |
| 30          | System rendering resources access messages                                    |
| 3           | Work Load Manager (WLM) workflow messages                                     |
| 145         | Control-V Index values search messages                                        |
| 161         | GET/PUT diagnostic trace for CDAMs created with <i>block table</i> at the end |
| 229         | Security trace from exit CTDSE24                                              |

**Table 339 Control-D/V IOA online facilities trace levels**

| Component       | Trace level | Trace action                                    |
|-----------------|-------------|-------------------------------------------------|
| Online U screen | 1           | Control-V Index files processing messages       |
|                 | 8           | Recipient tree search messages                  |
|                 | 20          | CDAM interface messages                         |
|                 | 21          | CDAM interface messages<br>Report list messages |
|                 | 22          | CDAM interface messages<br>Report list messages |
|                 | 23, 24      | Report list messages                            |
|                 | 25          | Note access messages                            |
|                 | 28          | Global Index DB2 Interface messages             |
|                 | 145         | Control-V Index values search messages          |
|                 | 225         | Security trace from exit CTDSE04                |
|                 | 230         | Security trace from exit CTDSE26                |

| Component              | Trace level | Trace action                                                                  |
|------------------------|-------------|-------------------------------------------------------------------------------|
| Online Immediate print | 30          | Access to system rendering resources                                          |
|                        | 161         | GET/PUT diagnostic trace for CDAMs created with <i>block table</i> at the end |
| Online T screen        | 8           | Recipient tree search messages                                                |
|                        | 230         | Security trace from exit CTDSE26                                              |
| Online A screen        | 226         | Security trace from exit CTDSE08                                              |
|                        | 230         | Security trace from exit CTDSE26                                              |
| Online F screen        | 227         | Security trace from exit CTDSE19                                              |
| Online DO screen       | 247         | Security trace from exit CTDSE28                                              |

**Table 340 Control-D/V monitor trace levels**

| Component         | Trace level | Trace action                                                      |
|-------------------|-------------|-------------------------------------------------------------------|
| Control-D monitor | 2, 3        | Decollation SYSOUTs from JES spool                                |
|                   | 4           | SYSOUT - CDAM decollation trace                                   |
|                   | 5           | SYSPLEX support messages                                          |
|                   | 8           | Recipient tree search messages                                    |
|                   | 9           | IDCAMS interface messages                                         |
|                   | 11          | Print plan create messages                                        |
|                   | 12          | Variable processing messages                                      |
|                   | 13, 14      | Backup, Migration, Restore job creating messages                  |
|                   | 18          | Detail Variable processing messages                               |
|                   | 19, 21      | Decollation with adding indexes to Global Index Database messages |
|                   | 27          | Generic process workflow trace                                    |
|                   | 28          | Global Index database Interface messages                          |
|                   | 29          | MQ Series messages                                                |



| Component             | Trace level | Trace action                                                                  |
|-----------------------|-------------|-------------------------------------------------------------------------------|
|                       | 30          | Access to system rendering resources                                          |
|                       | 39          | Subsystem Status Request messages                                             |
|                       | 49          | Detail Subsystem Status Request messages                                      |
|                       | 83          | Synchronization messages                                                      |
|                       | 87, 88, 89  | Control-V Index creating messages                                             |
|                       | 145         | Control-V Index files creating messages                                       |
|                       | 161         | GET/PUT diagnostic trace for CDAMs created with <i>block table</i> at the end |
|                       | 224         | Security trace from the exit CTDSE01                                          |
|                       | 227         | Diagnostic trace for rejected GENERIC SYSOUTs                                 |
| Print monitor         | 10          | Printing SYSOUT allocation messages                                           |
|                       | 30          | System rendering resources access messages                                    |
|                       | 87          | STORE=Y CTV Index creating messages                                           |
|                       | 88          | STORE=Y CTV Index creating messages                                           |
|                       | 89          | STORE=Y CTV Index creating messages                                           |
|                       | 145         | Control-V Index files creating messages                                       |
|                       | 161         | GET/PUT diagnostic trace for CDAMs created with <i>block table</i> at the end |
| File transfer monitor | 20, 21      | File transfer subtask messages                                                |
|                       | 24          | File transfer main task messages                                              |

**Table 341 Control-D/V utility trace levels**

| Component              | Trace level | Trace action                        |
|------------------------|-------------|-------------------------------------|
| CTVGICL<br>(TRACE=YES) | 18          | Global Index cleaning messages      |
|                        | 28          | Global Index DB2 Interface messages |

| Component               | Trace level | Trace action                             |
|-------------------------|-------------|------------------------------------------|
| CTVUPGDB<br>(TRACE=YES) | 19          | Reports and Indexes selection messages   |
| CTVUPGDB<br>(TRACE=ALL) | 21          | Adding to Global Index Database messages |
| CTVGICLK<br>(TRACE=YES) | 19, 21      | Global Index integrity checking messages |
|                         | 28          | Global Index DB2 Interface messages      |
| CTDDIG                  | 87          | Alternative index messages               |
| CTDUPTR                 | 8           | Recipient tree search messages           |
| CTDAUTR                 | 8           | Recipient tree search messages           |
| CTDCCU                  | 9           | IDCAMS interface messages                |
| CTDRSD                  | 140         | Resource records reading messages        |
| CTVACDT                 | 145         | ACD checking messages                    |
| CTVCLMIG                | 145         | Migrated reports deleting messages       |
|                         | 146         | Tape volumes status messages             |
| CTVDELI                 | 145         | Control-V Indexes deleting messages      |
| CTVJAR                  | 145         | JCL Archiving consolidation messages     |
| CTVUNMIG                | 145         | Unmigrate messages                       |
|                         | 147,<br>148 | Access to Centera messages               |

**Table 342 Control-D/V other trace levels**

| Component          | Trace level | Trace action                                                                            |
|--------------------|-------------|-----------------------------------------------------------------------------------------|
| IOA Archive server | 145         | Control-V Index values searching messages<br>Access to migrated reports detail messages |
|                    | 146         | Media status checking messages                                                          |

| Component                 | Trace level | Trace action                                                        |
|---------------------------|-------------|---------------------------------------------------------------------|
|                           | 147,<br>148 | Access to Centera messages                                          |
|                           | 149         | Access to Centera performance messages                              |
| Control-V Migration job   | 145         | Control-V Migration messages                                        |
|                           | 146         | FEMIGRATE records processing messages<br>Migration to tape messages |
|                           | 147,<br>148 | Access to Centera messages                                          |
| Restore converted reports | 145,<br>146 | Converted archived reports restore messages                         |
|                           | 147         | CA-DISPATCH archived reports restore detail messages                |
| IOA Access method         | 12          | CTD user file interface when error is detected                      |
|                           | 16          | CTD user file interface                                             |

## J Control-M diagnostic trace levels

This topic contains a partial listing of diagnostic trace levels available for Control-M. See [Internal Trace facility](#) (on page 178) for more information on the meaning of traces and how to set them. Do NOT set a trace unless specifically requested to do so by BMC Customer support.

**Table 343 Control-M diagnostic trace levels**

| Component                       | Trace Levels |
|---------------------------------|--------------|
| CKP updates                     | 98           |
| CMEM ON SPOOL JOB (CMEM side)   | 3            |
| Control-R                       | 1,2,3        |
| CTMAPI                          | 222          |
| CTMJOB                          | 221,10       |
| CTMPLEX distribution of work    | 99           |
| CTMPLEX maintenance             | 99           |
| CTMRUN                          | 15, 81,41    |
| DO FORCEJOB (CTM side)          | 10           |
| EM communication                | 13           |
| EM COND update                  | 28           |
| EM Control Resource update      | 26           |
| EM Download                     | 31           |
| EM Quantitative resource update | 27           |
| EM Upload                       | 34           |
| EM User requests                | 14           |
| JDL re-build flows              | 14           |
| Journaling                      | 73,74,162    |

| Component                        | Trace Levels                              |
|----------------------------------|-------------------------------------------|
| Monitor performance              | 48                                        |
| Newday (CTMFRM)                  | 223                                       |
| Resource maintenance in selector | 20,21,22, 24                              |
| Selection process                | 17,18, 75,163                             |
| Selection process Performance    | 23, 58                                    |
| Spyer NJE                        | 79                                        |
| Spyer performance                | 78                                        |
| Spyer Post-Processing            | 31,33,35,36, 39, 49, 49, 50,55 (PSO/SAPI) |
| Submitter                        | 31,32                                     |
| TIMEZONE processing              | 97                                        |
| Tracker/Receiver                 | 166                                       |

**Table 344 Control-M/Enterprise Manager common trace levels, programs A-G**

| Trace level and component                         | Program     |                  |                  |                  |                  |             |             |                  |             |                  |             |             |
|---------------------------------------------------|-------------|------------------|------------------|------------------|------------------|-------------|-------------|------------------|-------------|------------------|-------------|-------------|
|                                                   | A<br>D<br>D | C<br>M<br>G<br>R | C<br>O<br>M<br>C | C<br>O<br>M<br>S | C<br>O<br>M<br>T | D<br>E<br>L | D<br>E<br>T | D<br>W<br>S<br>L | G<br>E<br>T | G<br>N<br>R<br>L | G<br>T<br>I | G<br>T<br>W |
| 10 – Most components; impractical                 |             | X                | X                | X                | X                |             | X           | X                | X           | X                | X           | X           |
| 11 – Receiver communication                       |             | X                |                  |                  |                  |             |             |                  |             |                  |             |             |
| 12 – Sender communication                         |             | X                |                  |                  |                  |             |             |                  |             |                  |             |             |
| 13 – Receiver and sender                          |             | X                |                  |                  |                  |             |             |                  |             |                  |             |             |
| 14 – All CTM/EM user requests, including download |             |                  |                  |                  |                  |             |             |                  |             |                  |             |             |
| 15 – DB updates                                   |             |                  |                  |                  |                  |             | X           |                  |             |                  |             |             |
| 16 – Main task                                    |             |                  |                  |                  |                  |             |             |                  |             |                  | X           | X           |
| 17 – An entire SIB chain, disabled                |             |                  |                  |                  |                  |             |             |                  |             | X                |             |             |
| 18 – Put a message into I/O queue                 |             |                  |                  |                  |                  |             |             |                  |             |                  |             |             |
| 19 – Get a message from I/O queue                 |             |                  |                  |                  |                  |             |             | X                |             |                  |             |             |
| 20 – VTAM interface                               |             |                  |                  | X                | X                |             |             |                  |             |                  |             |             |
| 22 – Performance: Server                          |             | X                |                  | X                | X                |             |             |                  |             |                  |             |             |
| 23 – Performance: Server & detector               |             | X                |                  |                  |                  |             | X           |                  |             |                  |             |             |
| 24 – Performance: minimum printings               |             |                  |                  |                  |                  |             |             |                  |             |                  |             |             |
| 25 – Detector: conditions/resources               |             |                  |                  |                  |                  |             |             |                  |             |                  |             |             |
| 26 – Detector: control resources                  |             |                  |                  |                  |                  |             |             |                  |             |                  |             |             |
| 27 – Detector: quantitative resources             |             |                  |                  |                  |                  |             |             |                  |             |                  |             |             |
| 28 – Detector: prerequisite conditions            |             |                  |                  |                  |                  |             |             |                  |             |                  |             |             |
| 29 – Detector: all text of database updates       | X           |                  |                  |                  |                  | X           |             |                  |             |                  |             |             |
| 30 – Detector: short printings                    |             |                  |                  |                  |                  |             | X           |                  |             |                  |             |             |

| Trace level and component                      | Program     |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
|------------------------------------------------|-------------|------------------|-----------------------|-----------------------|-----------------------|-------------|-------------|------------------|-------------|------------------|-------------|-------------|
|                                                | A<br>D<br>D | C<br>M<br>D<br>R | C<br>O<br>M<br>M<br>C | C<br>O<br>M<br>M<br>S | C<br>O<br>M<br>M<br>T | D<br>E<br>L | D<br>E<br>T | D<br>W<br>S<br>L | G<br>E<br>T | G<br>N<br>R<br>L | G<br>T<br>I | G<br>T<br>W |
| 31 – Convert job from AJF to comm. format      |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 32 – Convert sched. parameters to comm. format |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 33 – Job statistics                            |             |                  |                       |                       |                       |             |             | X                |             |                  |             |             |
| 34 – Convert job from comm. format to AJF      |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 35 – Transformer error                         |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 40 – ADDer                                     | X           |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 41 – DEleter                                   |             |                  |                       |                       |                       | X           |             |                  |             |                  |             |             |
| 43 – POINTer                                   |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 49 – ADDer, DEleter & POINTer                  | X           |                  |                       |                       |                       | X           |             |                  |             |                  |             |             |
| 50 – Level 49+                                 | X           |                  |                       |                       |                       | X           | X           |                  |             |                  | X           |             |
| 51 – Each seq. # sent by updater               |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 52 – Base level, synch level, conf. level      |             |                  |                       |                       |                       |             | X           |                  |             |                  |             |             |
| 60 – Server                                    |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 61 – Data compression sizes                    |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 70 – IOAGATE                                   |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 81 - XDSECT processing                         |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 82 - CCM Synch and Life check request          |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 83 - CCM Modify commands                       |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 84 - CCM Parameter editing                     |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 99 – KeepAlive service                         |             |                  |                       |                       |                       |             |             |                  |             |                  |             |             |
| 100 – Send/receive message headers             |             | X                |                       |                       |                       |             | X           |                  |             |                  |             |             |

| Trace level and component                 | Program     |                  |                  |                  |                  |             |             |                  |             |                  |             |             |
|-------------------------------------------|-------------|------------------|------------------|------------------|------------------|-------------|-------------|------------------|-------------|------------------|-------------|-------------|
|                                           | A<br>D<br>D | C<br>M<br>G<br>R | C<br>O<br>M<br>C | C<br>O<br>M<br>S | C<br>O<br>M<br>T | D<br>E<br>L | D<br>E<br>T | D<br>W<br>S<br>L | G<br>E<br>T | G<br>N<br>R<br>L | G<br>T<br>I | G<br>T<br>W |
| 101 – Job transaction                     |             |                  |                  |                  | X                |             | X           |                  |             |                  |             |             |
| 122 – Download and update flow statistics |             | X                |                  |                  |                  |             |             |                  |             |                  |             |             |
| 123 – Upload requests & reply headers     |             | X                |                  |                  |                  |             |             |                  |             |                  |             |             |
| 200 – TCP/IP communication / SAS (C)      |             |                  | X                |                  |                  |             |             |                  |             |                  |             |             |

**Table 345 Control-M/Enterprise Manager common trace levels, programs K-U**

| Trace level and component                         | Program     |             |             |                       |             |             |             |                  |             |             |             |             |  |
|---------------------------------------------------|-------------|-------------|-------------|-----------------------|-------------|-------------|-------------|------------------|-------------|-------------|-------------|-------------|--|
|                                                   | K<br>P<br>A | K<br>S<br>L | M<br>B<br>X | P<br>O<br>I<br>N<br>T | P<br>U<br>T | R<br>D<br>T | S<br>C<br>H | S<br>R<br>V<br>R | T<br>R<br>A | U<br>J<br>B | U<br>P<br>D | U<br>S<br>C |  |
| 10 – Most components; impractical                 |             | X           |             |                       | X           | X           | X           | X                | X           | X           | X           | X           |  |
| 11 – Receiver communication                       |             |             |             |                       |             |             |             |                  |             |             |             |             |  |
| 12 – Sender communication                         |             |             |             |                       |             |             |             |                  |             |             |             |             |  |
| 13 – Receiver and sender                          |             |             |             |                       |             |             |             |                  |             |             |             |             |  |
| 14 – All CTM/EM user requests, including download |             | X           |             |                       |             |             |             | X                |             |             |             |             |  |
| 15 – DB updates                                   |             |             |             |                       |             | X           |             |                  |             |             |             |             |  |
| 16 – Main task                                    |             |             |             |                       |             |             |             |                  |             |             |             |             |  |
| 17 – An entire SIB chain, disabled                |             |             |             |                       |             |             |             |                  |             |             |             |             |  |
| 18 – Put a message into I/O queue                 |             |             |             |                       | X           |             |             |                  |             |             |             |             |  |
| 19 – Get a message from I/O queue                 |             |             |             |                       |             |             |             |                  |             |             |             |             |  |
| 20 – VTAM interface                               |             |             |             |                       |             |             |             |                  |             |             |             |             |  |
| 22 – Performance: Server                          |             | X           |             |                       |             |             |             | X                |             |             |             |             |  |



| Trace level and component                      | Program     |             |             |                       |             |             |             |                  |             |             |             |             |
|------------------------------------------------|-------------|-------------|-------------|-----------------------|-------------|-------------|-------------|------------------|-------------|-------------|-------------|-------------|
|                                                | K<br>P<br>A | K<br>S<br>L | M<br>B<br>X | P<br>O<br>I<br>N<br>T | P<br>U<br>T | R<br>D<br>T | S<br>C<br>H | S<br>R<br>V<br>R | T<br>R<br>A | U<br>J<br>B | U<br>P<br>D | U<br>S<br>C |
| 23 – Performance: Server & detector            |             |             |             |                       |             |             |             | X                |             |             |             |             |
| 24 – Performance: minimum printings            |             |             |             |                       |             |             |             | X                |             |             |             |             |
| 25 – Detector: conditions/resources            |             |             |             |                       |             | X           |             |                  |             |             |             |             |
| 26 – Detector: control resources               |             |             |             |                       |             | X           |             | X                |             |             |             |             |
| 27 – Detector: quantitative resources          |             |             |             |                       |             | X           |             | X                |             |             |             |             |
| 28 – Detector: prerequisite conditions         |             |             |             |                       |             | X           |             | X                |             |             |             |             |
| 29 – Detector: all text of database updates    |             |             |             |                       |             |             |             |                  |             |             |             |             |
| 30 – Detector: short printings                 |             |             |             |                       |             |             |             |                  |             |             |             |             |
| 31 – Convert job from AJF to comm. format      |             |             |             |                       |             |             |             |                  | X           |             |             |             |
| 32 – Convert sched. parameters to comm. format |             |             |             |                       |             |             | X           |                  |             |             |             | X           |
| 33 – Job statistics                            |             |             |             |                       |             |             |             |                  |             |             |             |             |
| 34 – Convert job from comm. format to AJF      |             |             |             |                       |             |             |             |                  |             | X           |             |             |
| 35 – Transformer error                         |             |             |             |                       |             |             |             |                  | X           |             |             |             |
| 40 – ADDer                                     |             |             |             |                       |             |             |             |                  |             |             |             |             |
| 41 – DELeTer                                   |             |             |             |                       |             |             |             |                  |             |             |             |             |
| 43 – POINTer                                   |             |             |             | X                     |             |             |             |                  |             |             |             |             |
| 49 – ADDer, DELeTer & POINTer                  |             |             |             | X                     |             |             |             |                  |             |             |             |             |
| 50 – Level 49+                                 | X           |             |             | X                     |             |             |             | X                |             |             | X           |             |
| 51 – Each seq. # sent by updater               |             |             |             |                       |             |             |             |                  |             |             | X           |             |
| 52 – Base level, synch level, conf. level      |             |             |             |                       |             |             |             | X                |             |             | X           |             |
| 60 – Server                                    |             |             |             |                       |             |             |             | X                |             |             |             |             |

| Trace level and component                 | Program     |             |             |                       |             |             |             |                  |             |             |             |             |
|-------------------------------------------|-------------|-------------|-------------|-----------------------|-------------|-------------|-------------|------------------|-------------|-------------|-------------|-------------|
|                                           | K<br>P<br>A | K<br>S<br>L | M<br>B<br>X | P<br>O<br>I<br>N<br>T | P<br>U<br>T | R<br>D<br>T | S<br>C<br>H | S<br>R<br>V<br>R | T<br>R<br>A | U<br>J<br>B | U<br>P<br>D | U<br>S<br>C |
| 61 – Data compression sizes               |             |             |             |                       | X           |             |             |                  |             |             |             |             |
| 70 – IOAGATE                              |             |             | X           |                       |             |             |             |                  |             |             |             |             |
| 81 - XDSECT processing                    |             |             |             |                       |             |             |             | X                |             |             |             |             |
| 82 - CCM Synch and Life check request     |             |             |             |                       |             |             |             | X                |             |             |             |             |
| 83 - CCM Modify commands                  |             |             |             |                       |             |             |             | X                |             |             |             |             |
| 84 - CCM Parameter editing                |             |             |             |                       |             |             |             | X                |             |             |             |             |
| 99 – KeepAlive service                    | X           |             |             |                       |             |             |             |                  |             |             |             |             |
| 100 – Send/receive message headers        |             |             |             |                       |             |             |             |                  |             |             |             |             |
| 101 – Job transaction                     |             |             |             |                       |             | X           |             | X                |             |             |             |             |
| 122 – Download and update flow statistics |             |             |             |                       |             |             |             |                  |             |             |             |             |
| 123 – Upload requests & reply headers     | X           |             |             |                       |             |             |             |                  |             |             |             |             |
| 200 – TCP/IP communication / SAS (C)      |             |             |             |                       |             |             |             |                  |             |             |             |             |

## K Control-D audit service

### Overview

Many IT customers require a method for tracking events related to their IT processes and consequently to the business information produced. These audited events include user actions performed interactively on business reports and changes performed internally by Control-D and Control-V to the business information that it maintains and processes. The auditing option enables tracking user actions and changes to reports, providing the audit information to designated users for analysis.

The audit service is used for logging events in a central storage. Logging event information can be useful for:

- tracking user actions
- tracking system actions defined by user
- tracking workflow and history reports
- making Control-D SOX compliant

Actions can be created by:

- Users of mainframe online facilities
- Administrators System facilities
- Users of Control-D/WebAccess either through the regular screens or Control-D/CITKit
- Control-D and Control-V components

At a customer site, events can be reported from several MVS images, multiple IOA and Control-D components, and multiple Control-D/WebAccess servers, but all events are stored in the same storage. Centralizing the events information allows analyzing the data from a single data source.

If the Control-D and IOA components run on different MVS images their audit sysouts must be available for processing by one of the Control-D monitors. A common spool or Sysplex facility is required for this purpose. For more information, see [Running Multiple Monitors Using Sysplex Support](#) (on page 367).

The audit reports can be delivered to the specified recipients. All parameters for the reports are defined by the administrator in the audit decollation mission. Periodically unnecessary audit reports are deleted by the CTDDLRP utility. The audit reports can viewed with the U-screen, Control-D/WebAccess, and KSL commands and options.

## Running the auditing service

The general procedure involves the following steps:

1. Prepare the auditing service by
  - configuring the AUDTPARM member so the required audit information is generated
  - creating a set of decollation and printing missions, included in the NEWDAY procedure, that will collect the audit data
  - specifying audit reports in the Housekeeping procedures
2. Activate the auditing service

The following sections describe these steps in detail.

## Preparing the auditing service

The following preparations are required:

- Customize the AUDTPARM member in the PARM library to configure the auditing service for your system. In the AUDTPARM member you
  - define audit SYSOUTs parameters
  - define audit events

Each event consists of an action, such as Create or Print, an entity, and an audit level, by which you specify which event records are written to the audit SYSOUT. A user can define several levels of auditing in several EVENT blocks with different levels. However, only the level specified in the LEVEL block by LEVELA is active.
  - specify which missions collect and combine the audit information

This specification prevents the events of the audit missions from being included in the audit report.

For more information, see [Example 2 - AUDTPARM member](#) (on page 880).

- Create a decollation mission to collect audit SYSOUTs produced during a specific period. This decollation mission processes the SYSOUTs and creates many reports (one report for each SYSOUT) and stores the intermediate reports in the Control-D repository. See [Example 3 - Decollation mission for collecting audit SYSOUTs](#) (on page 881).
- Create a printing mission to create one SYSOUT. This printing mission combines the many intermediate reports stored in the Control-D repository and prints one audit SYSOUT for a specified period. See [Example 4 - Audit print mission](#) (on page 882).
- Create a decollation mission to create one audit report for a specific period. This decollation mission processes the audit SYSOUT produced by the printing mission and creates an audit report for a specified period, storing it in the Control-D repository. Control-V indexes can be created with this decollation mission to provide efficient access to the audit information. See [Example 5 - Decollation mission for storing audit report](#) (on page 883).
- Specify the audit reports in the Housekeeping procedures (Backup and Migrate missions, CTDDLRP, CTVCLMIG, CTDCLHST utilities).

**Table 346 AUDTPARM parameters**

| Block  | Parameter | Description                                                                                                                                                          |
|--------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SYSOUT | PORTION   | Maximum number of events in one SYSOUT                                                                                                                               |
|        | INTERVLA  | Maximum time interval between SYSOUTs in HHMMSS format                                                                                                               |
|        | CLASSA    | Audit CLASS                                                                                                                                                          |
|        | EXTWTR    | External writer name                                                                                                                                                 |
|        | DEST      | Printing destination for the audit reports                                                                                                                           |
|        | FORM      | Printing FORM for the audit reports                                                                                                                                  |
|        | DECMIS    | Specifies the audit decollation missions group - This specification prevents the events of the audit decollation mission from being included in the audit report.    |
| LEVEL  | LEVELA    | Audit level. The level can be one of the following:<br>0 (Disables the audit service.)<br>one of the LEVELE values used by the event definitions in the EVENT blocks |

| Block | Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EVENT | LEVELE    | <p>Specifies the level of the event. Events defined with the same level will be registered together for auditing.</p> <p>It is possible to define multiple EVENT blocks with the same LEVELE value. All of the events defined in these EVENT blocks are active if the same value that is specified for LEVELE is also specified for LEVELA.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|       | ACTION    | <p>Specifies a list of actions (operations), which will be registered for auditing if they are associated with one of the entities specified in the event definition (in the same EVENT block). The valid associations between the actions and entities appear in <a href="#">Event List</a> (on page 873). The valid action values are:</p> <ul style="list-style-type: none"> <li>▪ Create</li> <li>▪ Delete</li> <li>▪ Clear</li> <li>▪ View</li> <li>▪ Copy</li> <li>▪ Print</li> <li>▪ Defer_print (Deferred print)</li> <li>▪ Update</li> <li>▪ Backup</li> <li>▪ Migrate</li> <li>▪ MS_migrate (Multistage migrate)</li> <li>▪ Restore</li> <li>▪ Restore_req (Restore request)</li> <li>▪ Order</li> <li>▪ Local_print (on PC)</li> <li>▪ Local_save (on PC)</li> <li>▪ Add_version (of Note)</li> <li>▪ Move</li> <li>▪ E-mail</li> </ul> |

| Block | Parameter | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | ENTITY    | <p>Specifies a list of entities, which will be registered for auditing if they are associated with one of the actions specified in the event definition (in the same EVENT block). The valid associations between the actions and entities appear in <a href="#">Event List</a> (on page 873). The valid entity values are:</p> <ul style="list-style-type: none"> <li>▪ Session</li> <li>▪ Report</li> <li>▪ Sysdata</li> <li>▪ Def_report (Default report)</li> <li>▪ Index</li> <li>▪ Data_set</li> <li>▪ Ruler</li> <li>▪ Note</li> <li>▪ Mission</li> <li>▪ Member</li> </ul> |

## Activating the auditing service

### ➤ To activate auditing service

1. In the AUDTPARM member, specify the current audit level by setting the LEVELA parameter, in the LEVEL block, to the required audit level number. If LEVELA=0 no auditing will be preformed.
2. Restart all the Control-D and IOA online components.

## Event record structure

The event record, which is automatically stored in the audit database as a result of an action, contains the following information:

- [Basic event information](#) (on page 872) has a common structure for all the events (see the [Event List](#) (on page 873)). For example, an event, event time, and user name.
- [Detailed event information](#) (on page 876) includes additional data fields that vary according to the event. For example, a ruler name.

## Basic event information

**Table 347 Basic event information**

| Field               | Description                                                                                                                                                                                                                                                        |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Event date and time | The event timestamp                                                                                                                                                                                                                                                |
| Event               | Consists of the event action and the entity type. To know which associations between the possible actions and entities are valid, see <a href="#">Event List</a> (on page 873).                                                                                    |
| Owner type          | The following two types of owners can perform audit actions: <ul style="list-style-type: none"> <li>▪ User - For example, a user who logs into a repository or prints a report.</li> <li>▪ System - For example, the CTDDELRP utility deletes a report.</li> </ul> |
| Owner name          | The name of the event owner: either the ID of the logged-in user or the component name in the case of a system event.                                                                                                                                              |
| Session ID          | User Login Session Event Identification                                                                                                                                                                                                                            |
| Entity ID           | Entity Identification                                                                                                                                                                                                                                              |
| Event description   | Free text describing the event nature. For example, message code for unauthorized requests.                                                                                                                                                                        |
| Event status        | Event return code (including unauthorized request)                                                                                                                                                                                                                 |



## Event List

The following table, by showing the valid associations between the possible actions and entities, shows which events are possible to specify in AUDTPARM and to expect in the audit reports. In addition, the components, which are related to the entity types, are displayed. The table is divided into functional categories, such as security and housekeeping.

**Table 348      Event list**

| Action                                | Entity type    | Component                                          |
|---------------------------------------|----------------|----------------------------------------------------|
| Security                              |                |                                                    |
| Create (Login)                        | Session        | IOA online                                         |
| Delete<br>(Logout including Time out) |                | IOA online monitor<br>Control-D Application Server |
| Preparation                           |                |                                                    |
| Create                                | Mission        | R-screen                                           |
| Update                                |                | M-screen                                           |
| Copy                                  |                |                                                    |
| Delete                                |                |                                                    |
| Order (including Force)               |                |                                                    |
| Create                                | Member         | R-screen                                           |
| Update                                |                | M-screen                                           |
| Delete                                |                |                                                    |
| Add                                   | Default report | U-screen (Permanent)                               |
| Update                                |                |                                                    |
| Delete                                |                |                                                    |
| Decollation                           |                |                                                    |
| Create                                | Report         | Control-D monitor                                  |
| Create                                | Sysdata        |                                                    |

| Action                                                     | Entity type                    | Component                                                        |
|------------------------------------------------------------|--------------------------------|------------------------------------------------------------------|
| Create                                                     | Index                          |                                                                  |
| Print with STORE=Y                                         | Report                         | Control-D monitor                                                |
| Report Viewing                                             |                                |                                                                  |
| Create                                                     | Ruler                          | U-screen                                                         |
| Update                                                     |                                |                                                                  |
| Delete                                                     |                                |                                                                  |
| Create                                                     | Ruler (including Logical View) | Control-D Application Server,<br>Control-D/WebAccess             |
| Update                                                     |                                |                                                                  |
| Delete                                                     |                                |                                                                  |
| View                                                       | Report                         | U-screen<br>Control-D Application Server,<br>Control-D/WebAccess |
| Report Update                                              |                                |                                                                  |
| Copy (Give To)                                             | Report                         | U-screen<br>Control-D Application Server,<br>Control-D/WebAccess |
| Move                                                       | Report                         | Control-D Application Server,<br>Control-D/WebAccess             |
| Delete                                                     | Report                         | U-screen                                                         |
| Update                                                     |                                | Control-D Application Server,<br>Control-D/WebAccess             |
| Update                                                     | Sysdata                        | U-screen                                                         |
| Create<br>Add version<br>Update<br>Delete<br>Clear<br>View | Note                           | U-screen<br>Control-D Application Server,<br>Control-D/WebAccess |

| Action                                                       | Entity type | Component                                                |
|--------------------------------------------------------------|-------------|----------------------------------------------------------|
| Printing                                                     |             |                                                          |
| Print (Immediate)                                            | Report      | U, P-screen                                              |
| Deferred print                                               |             | Control-D Application Server,<br>Control-D/WebAccess     |
| Print (including special destinations and excluding STORE=Y) | Report      | Control-D Print monitor                                  |
| Create (Print STORE=Y)                                       | Report      | Control-D Print monitor                                  |
| Create (Print STORE=Y)                                       | Sysdata     |                                                          |
| Create (Print STORE=Y)                                       | Index       |                                                          |
| Local print                                                  | Report      | Control-D Application Server,<br>Control-D/WebAccess     |
| Local save                                                   |             |                                                          |
| E-mail                                                       |             |                                                          |
| Housekeeping                                                 |             |                                                          |
| Restore request                                              | Report      | U-screen                                                 |
| Update (No Restore)                                          |             |                                                          |
| Backup                                                       | Sysdata     | Backup job                                               |
| Migrate<br>Multistage migrate                                | Sysdata     | Migration job                                            |
| Restore                                                      | Sysdata     | Restore job                                              |
| Restore                                                      | Report      | Restore job                                              |
| Backup<br>Migrate                                            | Report      | CTDDELRP Utility                                         |
| Delete                                                       | Report      | CTDDELRP Utility<br>CTVCLMIG Utility<br>CTDCLHST Utility |
| Delete                                                       | Sysdata     |                                                          |
| Delete                                                       | Data_set    |                                                          |

## Detailed event information

Detailed event information consists of several data fields that are attached to the basic event information only when additional event data is required. The list of fields varies according the event. For example, for the Report View event, the additional required fields include the Report ID, the Report Name, the Report Type, and information about report manipulation and filtering data such Index path, and Logical View. The available additional fields that are associated with each event are predefined and constant.

## Audit Examples

This section contains the following examples that illustrate audit reports, the AUDTPARM member, and auditing missions:

[Example 1 - Audit reports](#) (on page 876)

[Example 2 - AUDTPARM member](#) (on page 880)

[Example 3 - Decollation mission for collecting audit SYSOUTs](#) (on page 881)

[Example 4 - Audit print mission](#) (on page 882)

[Example 5 - Decollation mission for storing audit report](#) (on page 883)

### Example 1 - Audit reports

- [Audit report, Example 1a, records three events reported after the Control-D monitor decollated the BANKING REPORT.](#) (on page 876)
- [Audit report, Example 1b, records four events reported after the end user viewed, updated, and printed the BANKING REPORT under separate TSO sessions.](#) (on page 878)

Audit report, Example 1a, records three events reported after the Control-D monitor decollated the BANKING REPORT.

- [Example 1a - Audit report](#) (on page 877)  
Shows the top of the report beginning with the following fields:  
VERSION=,COMPUTER=,SOURCE=,DATE=.
- The section contains data for the following fields: Event timestamp, Action, Entity, and Owner.
- [Example 1a - Audit report \(Continuation 1\)](#) (on page 877)  
Shows data for the following fields: Report, ODate, Category, User, Job, JID/Rul, DSN/Backup, and Time ID
- [Example 1a - Audit report \(Continuation 2\)](#) (on page 877)  
Shows data for the following fields: Type, Status, Loc, #cops, Missions Dest
- [Example 1a - Audit report \(Continuation 3\)](#) (on page 877)  
Shows data for the following fields: #pag/frp, #lin/top, Mis/Dec time, Job start time, Module, Act status

- [Example 1a - Audit report \(Continuation 4\)](#) (on page 878)  
Shows data for the following fields: Dscr Session ID, Entity ID
- [Example 1a - Audit report \(Continuation 5\)](#) (on page 878)  
Shows data for the following fields: Rel ID, Mis category, Mis ODate
- [Example 1a - Audit report \(Continuation 6\)](#) (on page 878)  
Shows data for the following fields: Mis RBA Key fields

## Example 1a - Audit report

| VERSION=' 01' , COMPUTER=' MVS3' , SOURCE=' IOAR900' , DATE=' 2009- 12- 03 8: 20: 38' |        |         |           |  |
|---------------------------------------------------------------------------------------|--------|---------|-----------|--|
| Event timestamp                                                                       | Action | Entity  | Owner     |  |
| 2009- 12- 03 8: 20: 38                                                                | Create | Sysdata | S DECMON4 |  |
| 2009- 12- 03 8: 20: 38                                                                | Create | Index   | S DECMON4 |  |
| 2009- 12- 03 8: 20: 38                                                                | Create | Report  | S DECMON4 |  |

## Example 1a - Audit report (Continuation 1)

| Report                                            | ODate        | Category | User | Job     | JID/Rul |
|---------------------------------------------------|--------------|----------|------|---------|---------|
| DSN/Backup Time ID                                |              |          |      |         |         |
| Note name                                         |              |          |      |         |         |
| Member Type                                       |              |          |      | Mission |         |
| CTD. D70. I900INR. J68988. D3371020. S94. N001B00 |              |          |      | I900INR | 368988  |
| BANKING REPORT                                    |              |          |      |         |         |
| BANKING REPORT                                    | 2015- 12- 03 | DAILY    | MKT  | I900INR | 368988  |

## Example 1a - Audit report (Continuation 2)

| Type | Status     | Loc  | #cops  | Missions | Dest    | C |
|------|------------|------|--------|----------|---------|---|
|      | Page       | Line | Column | #day     |         |   |
|      | Library    | DSN  |        | #vers    |         |   |
|      |            | A    |        | BKPMIS   | MI GMIS | T |
|      | Wait print | A    | 0001   | PRTMIS   | AAA     | T |

## Example 1a - Audit report (Continuation 3)

| #pag/frp | #lin/top | Mis/Dec      | time           | Job start time     | Module  | Act status |
|----------|----------|--------------|----------------|--------------------|---------|------------|
|          |          |              |                |                    | CTDRPUF | OK         |
|          |          |              |                |                    | CTDRPUF | OK         |
| 1        | 525      | 2009- 12- 03 | 8: 20: 36, 465 | 2009- 12- 03 8: 20 | CTDRPUF | OK         |

## Example 1a - Audit report (Continuation 4)

| Dscr             | Session ID      | Entity ID                |
|------------------|-----------------|--------------------------|
| C52DEF32B9646684 | SSYSDATAI900INR | C52DEF34FF822884         |
| C52DEF32B9646684 | SINDEXI900INR   | C52DEF34FF8228840001     |
| C52DEF32B9646684 | MKT             | I900INR C52DEF35165E4C06 |

## Example 1a - Audit report (Continuation 5)

| Rel ID 1                         | Mis category | Mis ODate |
|----------------------------------|--------------|-----------|
| SSYSDATAI900INR C52DEF34FF822884 |              |           |
| SSYSDATAI900INR C52DEF34FF822884 |              |           |

## Example 1a - Audit report (Continuation 6)

| Mis RBA | Key fields                                        |
|---------|---------------------------------------------------|
| 000037  | DS=' CTV. CTV70. I900INR. C09337. T102036. M4A96' |

Audit report, Example 1b, records four events reported after the end user viewed, updated, and printed the BANKING REPORT under separate TSO sessions.

- [Example 1b - Audit report](#) (on page 879)  
Shows the top of the report beginning with the following fields:  
VERSION=,COMPUTER=,SOURCE=,DATE=.  
The section contains data for the following fields: Event timestamp, Action, Entity, and Owner.
- [Example 1b - Audit report \(Continuation 1\)](#) (on page 879)  
Shows data for the following fields: Report, ODate, Category, User, Job, JID/Rul, DSN/Backup, and Time ID
- [Example 1b - Audit report \(Continuation 2\)](#) (on page 879)  
Shows data for the following fields: Type, Status, Loc, #cops, Missions Dest
- [Example 1b - Audit report \(Continuation 3\)](#) (on page 879)  
Shows data for the following fields: #pag/frp, #lin/top, Mis/Dec time, Job start time, Module, Act status
- [Example 1b - Audit report \(Continuation 4\)](#) (on page 880)  
Shows data for the following fields: Dscr Session ID, Entity ID

- [Example 1b - Audit report \(Continuation 5\)](#) (on page 880)  
Shows data for the following fields: Rel ID, Mis category, Mis ODate
- [Example 1b - Audit report \(Continuation 6\)](#) (on page 880)  
Shows data for the following fields: Mis RBA Key fields

## Example 1b - Audit report

| VERSION=' 01' , COMPUTER=' MVS3' , SOURCE=' IOAR900' , DATE=' 2009- 12- 03 9: 28: 46' |        |          |       |  |
|---------------------------------------------------------------------------------------|--------|----------|-------|--|
| Event timestamp                                                                       | Action | Entity   | Owner |  |
| 2009- 12- 03 9: 28: 46                                                                | Create | Sessi on | U Q23 |  |
| 2009- 12- 03 9: 28: 58                                                                | View   | Report   | U Q23 |  |
| 2009- 12- 03 9: 28: 58                                                                | Update | Report   | U Q23 |  |
| 2009- 12- 03 9: 29: 32                                                                | Print  | Report   | U Q23 |  |
| 2009- 12- 03 9: 29: 35                                                                | Delete | Sessi on | U Q23 |  |

## Example 1b - Audit report (Continuation 1)

| Report DSN/Backup Time ID | 0Date        | Category | User | Job       | JID/Rul |
|---------------------------|--------------|----------|------|-----------|---------|
| Note name                 |              |          |      |           |         |
| Member Type               |              |          |      | Mi ssi on |         |
| TSO                       |              |          |      |           |         |
| BANKING REPORT            | 2009- 12- 03 | DAILY    | MKT  | I 900INR  |         |
| BANKING REPORT            | 2009- 12- 03 | DAILY    | MKT  | I 900INR  |         |
| BANKING REPORT            | 2009- 12- 03 | DAILY    | MKT  | I 900INR  | DEFAULT |
| TSO                       |              |          |      |           |         |

## Example 1b - Audit report (Continuation 2)

| Type | Status  | Loc  | #cops | Mi ssi ons | Dest | C |
|------|---------|------|-------|------------|------|---|
|      | Page    | Line | #day  |            |      |   |
|      | Library | DSN  | #vers |            |      |   |
|      |         |      |       |            |      |   |
|      |         | A    |       |            |      |   |
|      |         | A    |       |            |      |   |
|      |         | A    | 0001  |            |      | M |

## Example 1b - Audit report (Continuation 3)

| #pag/frp | #lin/top | Mis/Dec | time | Job start time | Module  | Act status |
|----------|----------|---------|------|----------------|---------|------------|
|          |          |         |      |                |         |            |
|          |          |         |      |                | IOATBMN | OK         |
|          |          |         |      |                | IOATOLV | OK         |
|          |          |         |      |                | CTDTFRM | OK         |
|          |          |         |      |                | CTDDPR  | OK         |
|          |          |         |      |                | IOATBMN | OK         |
| 1        | 5        |         |      |                |         |            |

## Example 1b - Audit report (Continuation 4)

| Dscr | Session ID           | Entity ID                |
|------|----------------------|--------------------------|
|      | C52DFE6F427FA084     |                          |
|      | C52DFE6F427FA084 MKT | I900INR C52DEF35165E4C06 |
|      | C52DFE6F427FA084 MKT | I900INR C52DEF35165E4C06 |
|      | C52DFE6F427FA084 MKT | I900INR C52DEF35165E4C06 |
|      | C52DFE6F427FA084     |                          |

## Example 1b - Audit report (Continuation 5)

| Rel ID 1 | Mis category | Mis ODate |
|----------|--------------|-----------|
|----------|--------------|-----------|

## Example 1b - Audit report (Continuation 6)

| Mis RBA | Key fields                                |
|---------|-------------------------------------------|
|         | Exec remark=' Good' , OLD_Exec remark=' ' |

## Example 2 - AUDTPARM member

The following [AUDTPARM member code sample](#) (on page 881), defines the following audit configuration:

- The Control-D and IOA components issue an audit SYSOUT report every hour or if the audit report contains 10,000 events.
- The audit SYSOUT has the following parameters:
  - CLASS=A
  - EXTWTR=AUDIT
  - DEST=AUDIT
  - FORM=AUDT
- Any decollation mission in which AUDIT is specified for the GROUP parameter will not be registered.
- The following three levels of audit are defined:
  - Level 1 allows report viewing, e-mailing, saving, and printing, and all note actions to be registered.
  - Level 2 allows all actions with reports, notes, missions, and members to be registered.
  - Level 3 allows all actions to be registered.
- The current audit level is 2.



## AUDTPARM member code sample

```

*-----
*   Audit sysout
*-----
SYSOUT   PORTION=10000,           Max # of events in one sysout
         INTERVLA=010000,        Max interval HHMMSS between sysouts
         CLASS=A,                Class
         EXTWTR=AUDIT,           External Writer name
         DEST=AUDIT,             Destination
         FORM=AUDT,              Form
         DECMIS=AUDIT            Specific Decollation missions group
*-----
*   Audit level
*-----
LEVEL    LEVELA=2                Audit level or 0
*-----
*   Audit events level 1
*-----
EVENT    LEVELE=1,              Level of events
         ACTION=(View, Print, Defer_print,
                  Local_print, Local_save, E-mail),
         ENTITY=Report
EVENT    LEVELE=1,              Level of events
         ACTION=ALL,
         ENTITY=Note
*-----
*   Audit events level 2
*-----
EVENT    LEVELE=2,              Level of events
         ACTION=ALL,
         ENTITY=(Report, Note, Mission, Member)
*-----
*   Audit events level 3
*-----
EVENT    LEVELE=3,              Level of events
         ACTION=ALL,
         ENTITY=ALL

```

## Example 3 - Decollation mission for collecting audit SYSOUTs

The [Audit decollation mission code sample for collecting audit SYSOUTs](#) (on page 882) are generated by different Control-D and IOA components. Every day, this generic mission runs continuously, selecting any SYSOUT from CLASS A that has the following parameters (as they are defined in AUDTPARM):

- EXTWTR=AUDIT
- DEST=AUDIT
- FORM=AUDT

This mission creates intermediate audit reports and sets the AUDIT print mission for them.

The GROUP parameter is set to AUDIT, preventing the actions of this mission from being included in the audit report registration.

## Audit decollation mission code sample for collecting audit SYSOUTs

|               |                                                                |              |             |            |
|---------------|----------------------------------------------------------------|--------------|-------------|------------|
| CATEGORY      | AUDIT_COLLECTION                                               | JOBNAME *    | GENERIC Y   | MONITOR 1  |
| OWNER         | ADMIN                                                          | TASKTYPE REP | GROUP AUDIT | JOBID      |
| DESC          | DAILY AUDIT COLLECTION                                         |              |             |            |
| DESC          |                                                                |              |             |            |
| DAYS          | ALL                                                            |              |             | DCAL       |
| WDAYS         |                                                                |              |             | AND/OR     |
| MONTHS        | 1- Y 2- Y 3- Y 4- Y 5- Y 6- Y 7- Y 8- Y 9- Y 10- Y 11- Y 12- Y |              |             | WCAL       |
| DATES         |                                                                |              |             |            |
| CONF CAL      | SHIFT                                                          | RETRO N      | MAXWAIT 00  |            |
| MINIMUM       | PDS                                                            |              |             |            |
| IN            |                                                                |              |             |            |
| WHEN IN QUEUE | CLS                                                            | TIME FROM    | UNTIL       | INTERVAL   |
| DSN           |                                                                |              |             | PRIORITY   |
| OUT           |                                                                |              |             |            |
| SHOUT WHEN    |                                                                |              | TO          | URG        |
| MSG           |                                                                |              |             |            |
| DEF COPIES    | LVL                                                            | USER         | DEST        | MAX COPIES |
| ON CLASS      | = A                                                            | EXTWTR       | AUDIT       | DEST AUDIT |
| PRT COPIES    | LVL                                                            | USER         | DEST        | FORM AUDT  |
| PRINT/CDAM    | PARMS =                                                        |              |             | MAX COPIES |
| DO            |                                                                |              |             |            |
| WHEN LINE     | -                                                              | COL          | -           | PRINT      |
| STRING =      |                                                                |              |             | REF NXT    |
| DO USER       | = AUDITOR                                                      |              |             | CT         |
|               |                                                                | S N T B      |             | AND/OR     |
| DO NAME       | = AUDIT SINGLE REPORT                                          | LVL          | LINE        | COL        |
| DO PRINT      | = AUDIT                                                        | SYNONYM =    | CONCAT =    | -          |
|               |                                                                | MUST         | =           |            |

## Example 4 - Audit print mission

The [Code sample of an audit print mission for consolidating the audit reports into one SYSOUT](#) (on page 883) consolidates the intermediate audit reports into one SYSOUT. This print mission runs under the main print monitor (MONITOR set to 1) immediately after the new day procedure. The mission issues one consolidated audit SYSOUT into CLASS B based on the intermediate audit reports created during the previous day. The SYSOUT has no banners (NOBANNER) and uses existing control characters (ASIS-).

This SYSOUT has the following parameters:

- DEST=AUDIT
- EXTWTR=CONSOLID
- FORM=AUDT

The AUDIT-PRINT OUT condition is specified to start the audit decollation mission for the created SYSOUT.

## Code sample of an audit print mission for consolidating the audit reports into one SYSOUT

```

CATEGORY ASIS- , NOBANNER, AUDIT          MISSION AUDIT          MONITOR 1
OWNER     ADMIN          TASKTYPE PRT      GROUP   AUDIT
BATCH     N              SKELETON          FREE    CLOSE          TIMEOUT
OVERRIDE  CLASS B        DEST AUDIT        EXTWTR  CONSOLID      FORM AUDT
WRITER    OPTION
DESC      DAILY AUDIT CONSOLIDATION
DESC
=====
INCLUDE USER
EXCLUDE USER
SORT PARAMETERS: 1- USER  2- JOB  3- REPORT NAME 4- CATEGORY  5- LEVEL 6- TREE
                  7- FORMS 8- CHARS 9- MODIFY T- TIME/DATE E- USER DEFINED
ENTER SORT SEQ :
=====
DAYS  DCAL
   AND/OR
WDAYS  WCAL
MONTHS  1- Y 2- Y 3- Y 4- Y 5- Y 6- Y 7- Y 8- Y 9- Y 10- Y 11- Y 12- Y
DATES
CONFCAL          SHIFT  RETRO N MAXWAIT 00
CONFCAL          SHIFT  RETRO N MAXWAIT 00
MINIMUM          PDS
=====
IN
TIME FROM        TO        NOT LATER THAN    PRIORITY
ON PAGE#         ON LINE#  INTERVAL
=====
OUT              AUDIT-PRINT          ODAT +          TO          URGN
SHOUT WHEN
MSG
PRINTER          DEST          CHUNKSIZE
ON FORM
REQUEST
=====
STORE            BACKUP            MI GRATE

```

## Example 5 - Decollation mission for storing audit report

The [Code sample of a audit decollation mission for storing the audit report](#) (on page 884) in the Control-D repository. This regular mission runs immediately after the audit print mission because of the AUDIT-PRINT IN condition. The mission processes the main print monitor SYSOUT (JOBNAME=CTDPRINT) from CLASS B, which has the following parameters (as they are defined in the audit print mission):

- EXTWTR=CONSOLID
- DEST=AUDIT
- FORM=AUDT

This mission creates an audit consolidated report with record level indexes. The indexes provide efficient access to the audit information. The GROUP parameter is set to AUDIT, preventing the actions of this mission from being included in the audit report registration. The AUDIT-PRINT condition is deleted.

## Code sample of a audit decollation mission for storing the audit report

```

CATEGORY AUDIT_REPORTING      JOBNAME CTDPRINT  GENERIC N  MONITOR
OWNER     ADMIN      TASKTYPE REP GROUP AUDIT      JOBID
DESC      DAILY AUDIT REPORTING
DESC
=====
DAYS      ALL                                     DCAL      AND/OR
WDAYS   WCAL
MONTHS    1- Y 2- Y 3- Y 4- Y 5- Y 6- Y 7- Y 8- Y 9- Y 10- Y 11- Y 12- Y
DATES
CONFICAL      SHIFT      RETRO N MAXWAIT 00
MINIMUM       PDS
=====
IN          AUDIT-PRINT      ODAT
WHEN IN QUEUE  CLS      TIME FROM      UNTIL      INTERVAL      PRIORITY
DSN
=====
OUT          AUDIT-PRINT      ODAT -      SHOUT WHEN
TO          URG
MSG
=====
DEF COPIES    LVL      USER                                     DEST      MAX COPIES
=====
ON CLASS      = B      EXTWTR CONSOLID      DEST AUDIT      FORM AUDT
PRT COPIES    LVL      USER      DEST      MAX COPIES
PRINT/CDAM PARMS =
DO
WHEN LINE      -      COL      -      PRINT      REF NXT      CT      AND/OR
STRING =
DO USER      = AUDITOR      LVL      LINE      COL      -
S N T B      SYNONYM =      CONCAT =
DO NAME      = AUDIT CONSOLIDATED REPORT
DO INDEX      = ENTITY      M R G      LINE +00000 COL 00034 - 00043
MASK = :      RC Y LINE 00001 - 00100 COL 00015 - 00015
PRINT=      TYPE
02 SUBINDX = NAME      M LVL 02 LINE +00000 COL 00057 - 00076
MASK = :      RC Y LINE 00001 - 00100 COL 00015 - 00015
PRINT=      TYPE

```



458667